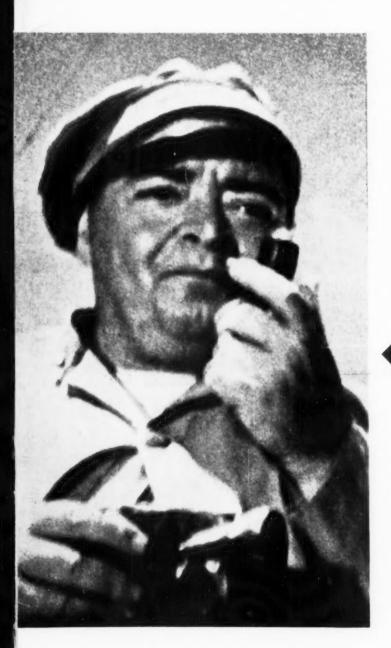
# Chemical Week-



MARCH 5. 1960

Price 50 cents

Dozen plastics makers scramble for polyformaldehyde markets p. 23

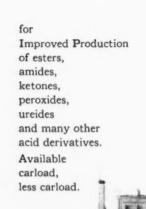
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STEVENS RICE



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#### TOP OF THE WEEK

MARCH 5, 1960

- Now two chemicals-from-anthracite projects are on the griddle.

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- Foreign assignment: now a happy hunting ground. CPI companies become more selective in filling overseas posts. p. 43
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- 24 Philadelphia and Reading Corp. now conspicuously diversified prepares to set up \$130-million chemicals - from - anthracite - waste operation.
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#### Nose Gets the Message

The picture on this week's cover calls attention to a story that admittedly gives off a strong odor — it's supposed to. To dramatize the effect sought by producers of scented movies, an odor of burning pipe tobacco was added to the paper on which the Specialties story is printed.

The tobacco aroma is the brainchild of Fragrance Process, Inc., a New York firm specializing in the application of scent to printed material. Vehicle for this two-pronged assault on the senses is a product called Color FPC Compound — a jellylike odor concentrate. This material may be put onto the page as a colorless coating or—with color added—it may be applied as printing ink.

Idea-man Alfred Neuwald, president of Fragrance Process, is confident that scented printing is on the verge of big things. In the past, fragrances of various sorts have been used to enhance the impact of direct mail pieces, disguise the less-than-lovely aroma of newspaper ink. Now, scented polyethylene is being used for food packaging, magazines are accepting scented advertising inserts, and seductive scents are being designed into point-of-purchase merchandising displays.

With odors as sublime as rose scent or as materialistic as new-car smell, the company is creating new markets for fragrance makers. Scented movies are but the most forceful evidence that the nose is coming into its own as a purchasing influence — which is why on this week's cover, we advise, "Smell p. 64."

#### MEETINGS

Instrument Society of America, temperature measurement symposium, Deshler-Hilton Hotel, Columbus, O., March 9-11.

American Concrete Institute, annual convention, Commodore Hotel, New York, March 14-17.

National Assn. of Corrosion Engineering, annual conference, Memorial Auditorium, Dallas, Tex., March 14-18

Synthetic Organic Chemical Manufacturers Assn., meeting, Roosevelt Hotel, New York, March 15.

#### VIEWPOINT

#### A Lesson from the Reds

THERE MAY BE DEEP SIGNIFICANCE in last week's Commerce Dept. report that the value of exports licensed for shipment to Communist countries during the last three months of '59 reached the highest level of any quarter in the last eight years (see p. 25). The last-quarter total: \$30.5 million, up sharply from the \$11.4 million approved in the third quarter.

The value of goods licensed for export to Communist countries does not bulk large in the total volume of U.S. exports. But this news may reveal a trend important to the chemical industry.

Included in the list of licensed exports are sizable quantities of isobutyl alcohol, sulfur and styrene. Approval of these commodities does not signal a change in Commerce Dept. policy; these chemicals are not in the department's mysterious "strategic" category.

U.S. government sources believe these increased commodity purchases may signify a shift in Soviet policy. Russia has been pressing hard to purchase U.S. chemical equipment and technology. Now it may have decided to settle for the end-products instead.

With the limited evidence at hand, it would be foolish to put too much weight on this conclusion. Russia and its allies have attempted to buy large quantities of chemical products in the past, even though these efforts were usually blocked by Commerce.

Our embargo policy, moreover, is not as effective as Commerce would like to think. We are blocking U.S. exports of petrochemical know-how, but our European allies have this same know-how (much of it from us), and one way or another it is going behind the Iron Curtain.

Nevertheless, Communist officials are busily signing pacts that include more and more purchases of Western chemicals. If this really is a trend, the underlying reason may be more fundamental than the conjectural success of the U.S. government's embargo policy.

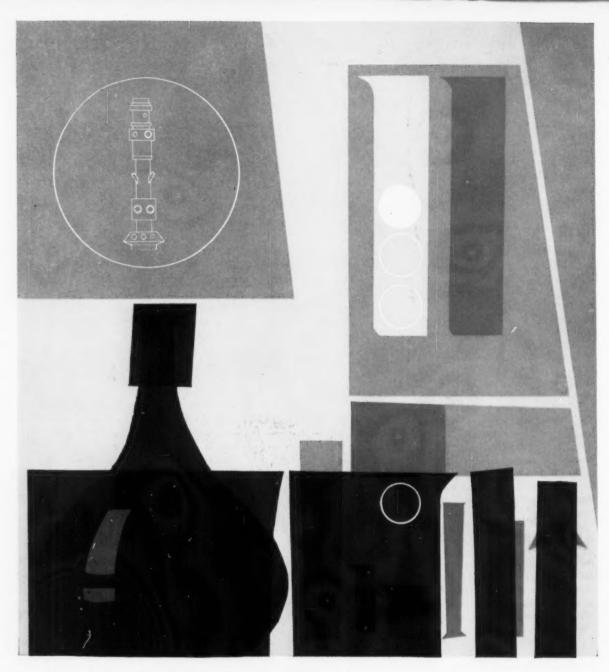
In part, of course, the Soviet bloc's increasing chemical purchases may be simply a fill-in of their temporary shortages.

But, as someone has said, "If there were no such thing as capitalism, Russia would have to invent it." The Communists have already had to accept such foreign concepts as pricing and interest. It is just possible that they are now discovering the virtues of another capitalist myth—the value of international trade as an organic part of the economic mechanism. They may be learning that it is impossible to exactly match output and consumption within a nation or even a limited group of nations. And they may be learning that it is sometimes cheaper to buy than it is to make.

If they are, this is a hopeful sign. It means that the Communists have another motive to be "good neighbors" with capitalist nations.

This is obviously a development that we should encourage. But we hardly encourage it with our restrictive trade policies. If the hide-bound Communists find it possible to alter their dogmas, perhaps we would be wise to review our policies—especially in view of their dubious success.

Editor-in-Chief



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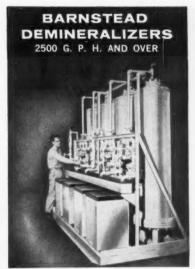
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Unsaponifiable Saponification Value Acid Value	1.0% max. 199 — 204 198 — 203	1.0 % max. 201 — 206 200 — 205	1.5 % max. 198 — 203 197 — 202	1.5 % max. 198 — 203 197 — 202	1.5 % max. 198 — 203 197 — 202	1.5 % max. 204 max. 203 max.
% F.F.A. as Oleic Acid Iodine Value (WIJS) Refractive Index	99.5 min. 95 max.	99.5 min. 90 max.	99 min. 95 max.	99 min. 94 max.	99 min. 92 max.	99 min. 85 max.
50°C. (Average) Total Polyunsaturated Fatty Acids	1.4500	1.4490 3.5% max.	1.4505 —	1.4500	1.4495	1.4485
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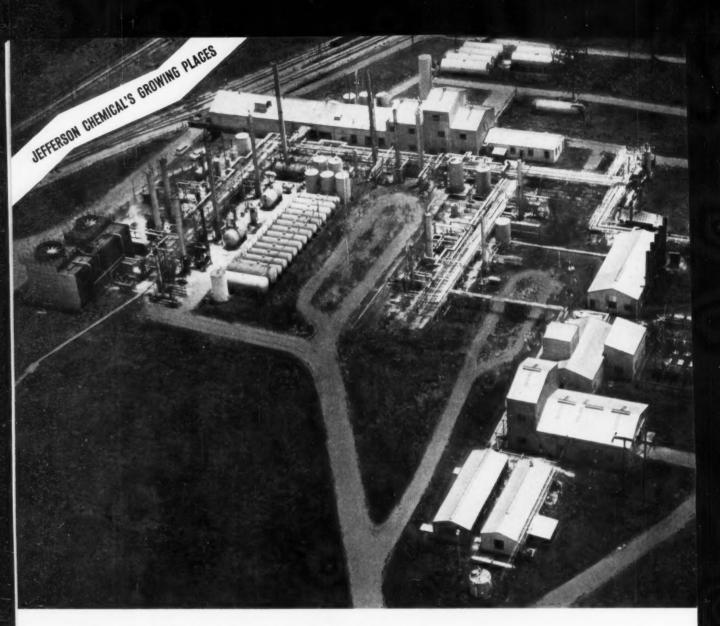
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### **Business**

#### Newsletter

CHEMICAL WEEK March 5, 1960 At home and abroad, chemical firms are boosting capital outlays.

The trend shows up clearly in individual companies' capital budgets—e.g., Du Pont spent about \$175 million last year, plans to spend about \$200 million this year. The Manufacturing Chemists' Assn.'s annual construction survey out this week tells the same story.

Noteworthy in MCA's latest survey: cost of projects scheduled for early groundbreaking and completion before '62 is \$458.5 million, a 4.6% increase from the "planned" projects total in last year's survey.

The over-all increase covers eight significant changes in product categories: planned facilities for petrochemicals, up more than threefold, to \$68.7 million; plastics and resins, up 66%, to \$90.8 million; general inorganic chemicals, up 54%, to \$62.9 million; laboratories, up 19%, to \$32.6 million; fertilizer chemicals, down 23%, to \$31.5 million; general organic chemicals, down 24%, to \$116.6 million; synthetic fibers, down 51%, to \$29 million; and chemical metals, down 62%, to \$7 million.

Latest on U.S. chemical companies' overseas expansion: Oronite Chemical and British Petroleum reportedly plan to invest more than \$25 million in two plants, one in Britain, one in West Germany. Principal products: o- and p-xylene, benzene, ethyl benzene. Construction probably will begin by year-end.

Sohio Chemical Co. is licensing its acrylonitrile process to three Japanese producers. Mitsubishi Chemical will put up a 20-tons/day plant, and Asahi Chemicals a 15-tons/day plant, if they get government approval. The third company hasn't been identified. The deals are all for royalties.

AviSun Corp. is forging ahead on polypropylene expansion. The engineering contract for its new, 100-million-lbs./year plant—estimated cost: \$30 million—has been awarded to Bechtel Corp. Sites are still under consideration. "We've narrowed it down to a few possibilities," says company President Chalmer Kirkbride. But it's likely the plant will be built in the Delaware Valley near AviSun's New Castle, Del., facilities.

Meanwhile, AviSun is expanding its Port Reading, Pa., plant (leased from Koppers) from 20 million to 25 million lbs./year (CW, Nov. 14, '59, p. 53).

#### Phenol and nitrogen chemicals are making growth news.

• Solar Nitrogen Chemicals, a jointly owned subsidiary of Atlas Powder and Standard Oil (Ohio), is starting a \$2-million expansion program for ammonia, urea, nitric acid and nitrate facilities at its Lima, O., plant. Ammonia capacity will be increased about 25,000 tons/year.

#### **Business**

#### Newsletter

(Continued)

• Allied Chemical's Plastics and Coal Chemicals Division is expanding its synthetic phenol plant at Philadelphia. Present capacity—estimated at 40 million lbs./year—will be increased about 5 million lbs., with added capacity becoming available late this year. Allied says part of the new capacity will be for its caprolactam and phenolic resins, the rest for outside sales.

Parke, Davis & Co. violated the Sherman antitrust act while trying to maintain resale prices in non-"fair trade" areas in and around Washington, D.C., the Supreme Court ruled this week. By six-to-three vote, the justices sent the case back to the trial court for an order barring further violations. In the trial court, the company will get another chance to fight the charges. Cited as one antitrust violation: pressure on wholesalers to refuse to sell to price-cutting retailers. For the dissenters, Justice John Harlan protested that the majority's opinion leaves industry "wholly in the dark" on its right to select its customers.

Nylon-6,6 yarns will get another boost: Chemstrand plans to increase "by more than 50%" its capacity for production of nylon-6,6 tire and carpet yarns and yarns for industrial uses.

President Edward O'Neil says 90% of nylon yarn currently being used in tires is the 6,6 type; he expects this type of nylon to continue its hold on the tire-cord market. The company also reports its new textured Cumuloft nylon carpet yarn is expected to require production of additional nylon-6,6 poundage this year. The expansion will begin immediately, with substantial gains in production expected by the end of the year.

The already dim outlook for private enterprise in Cuba was further darkened late last week by Premier Fidel Castro. In a meeting that kicked off Cuba's new industrialization plan, Castro declared that any new private foreign investments entering Cuba must surrender total control to the government. He did not spell out what will happen to investments that are already there; their fate lies in the hands of the new central planning board (see p. 26).

Castro plans to go into the chemical business. As part of the Agrarian Reform Institute's \$152-million industrial investment program for '60, the government will spend \$33 million on chemical plants, \$4 million on mineral industries, \$76 million on iron and steel facilities.

Funds for Cuba's industrialization over the next five years are expected to come from a 4% deduction from all organized workers salaries, as well as from the \$100-million credit recently committed by the Soviet Union.

Russia will supply plants, and technicians to set them up. Under the trade agreement signed at the same time, Russia will pay for part of its sugar purchases with basic commodities, including caustic soda, aluminum, sulfur and fertilizer.



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GLUTARALDEHYDE resembles formaldehyde or acetaldehyde in reactions with water, alcohols, phenols, and amines. In addition to expected linear derivatives, GLUTARALDEHYDE also exhibits the distinctive feature of forming six membered rings in a number of reactions. Typical reaction products are indicated above.

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GLUTARALDEHYDE can be used to cross-link materials containing —OH, —NHR, and —SH functional groups and, in this way, has proved useful in tanning leather, in shrink-proofing rayon, and for insolubilization of gelatin, casein, starch, and poly-

vinyl alcohol. Other potential applications include textile crease-proofing, use in paper and paint manufacture to impart water insensitivity, silver plating (reducing agent), and in the plastic-resin fields.

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Product Development Department Industrial Chemicals Division Shell Chemical Company 110 West 51st Street, New York 20, N.Y.

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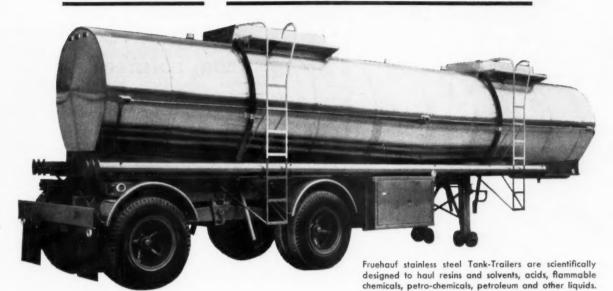
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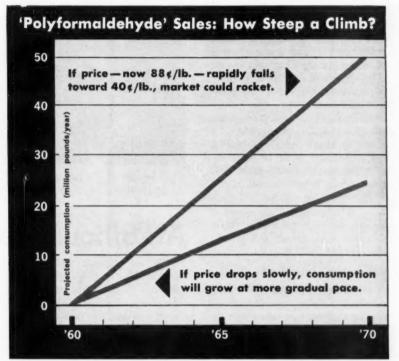
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### **New Question in Plastics**

The chart above sketches an "either-or" situation that is tantalizing potential producers of polyformaldehyde — a bustling young plastic that threatens to compete with zinc, aluminum and brass as well as molding and extrusion resins. By this week a dozen companies all over the world were moving closer to production of formaldehyde-based high polymers.

The world's only commercial producer now is Du Pont, whose new, \$40-million Delrin plant at Parkersburg, W. Va., has an initial capacity of 12 million lbs./year. This plant is reported to be in full production, offering both molding and extrusion grades in 14 colors.

Du Pont has just dropped the price to 88¢/lb. in truckload quantities for natural colored resin; the development price was 95¢. And plastics industry sources anticipate that the price—tied to the low cost of formaldehyde — will continue to decline.

Meanwhile, various U.S. and foreign companies have plans for this highly crystalline thermoplastic. Its attractive properties: high tensile strength, "infinite" fatigue life, ease of fabrication, low moisture absorption, and high resistance to corrosion.

European Research: It's known that in England, Imperial Chemical Industries was deep in work on polyoxymethylene resins a few years back. But the company has been very quiet on this score recently.

In West Germany, three successor companies of the old, prewar I. G. Farben combine reportedly are forging ahead on their own. First of the three expected to take the wraps off its products: Badische Anilin- & Soda-Fabrik, while both Farbwerke Hoechst and Farbenfabriken Bayer are said to be in advanced stages of development on these resins.

A BASF process for high-purity formaldehyde — key to production

of the crystalline polymer — is described in a new German patent application.

But perhaps even closer to commercial production, and reportedly extremely enthusiastic about the properties of its product, is the Netherlands firm of Staatsmijen (Limburg). This company is said to have a product quite similar to Delrin.

And a new synthetic formaldehyde resin, developed at Japan's Kyoto University, is reportedly being readied for production (CW Technology Newsletter, Feb. 27). This resin is described as entirely different from Delrin, having larger molecules and higher heat-stability than other formaldehyde-derived resins.

Recently, reports have been flowing out of Japan regarding both polyacetaldehyde and polypropionaldehyde, logical offshoots of polyformaldehyde. These materials, however, are said to be unstable and rubbery.

A French firm reportedly studying polyformaldehydes: St. Gobain.

Watching and Waiting: While some of these companies have gone a long way in development work, European firms will likely wait and see how Du Pont fares with its product. And here at home, the key to other companies' plans rests on both patents and prices.

Consensus is that Du Pont can afford to — and probably will — move slowly. Du Pont foresees a market in hundreds of machine, hardware and industrial items by 1965, is expected to keep the price somewhere near 80¢/lb.

Du Pont predicted some months ago that, by 1964, auto makers will use about 2 lbs. of Delrin resin per car — in door handles, fuel pumps and instrument housings—a 12-million-lbs./year market. It also foresees 75% of Delrin's market in replacement of metals, only 10% derived from victories over other plastics.

On the other hand, polyformaldehyde, like many other plastics, burns and is unstable to ultraviolet light—possible sales-limiting factors.

One U.S. firm that has expressed great interest in polyoxymethylene is Reichhold Chemicals (White Plains, N.Y.). Reichhold—a major producer of formaldehyde and various resins—is impressed by the plastic's "unusual strength characteristics." The company admits to "a certain amount of work" in polyformaldehyde, but is not enthusiastic about the present price. "But at 85¢/lb. the market wouldn't have to be large to be self-supporting," says an RCI man, "and ultimately the cost of high-purity formaldehyde could be brought down."

Other U.S. companies do not admit to specific interest in, or development work on, such polymers; but leading producers of formaldehyde — e.g., Monsanto, Celanese, Commercial Solvents, Heyden Newport and Allied Chemical — doubtless are following polyformaldehyde progress with considerable interest.

Du Pont says it has three kinds of patents on Delrin, of which the key one (U.S. 2,768,994, issued in Oct. '56) describes the MacDonald process for producing a high-molecular-weight polymer having high thermal stability. Du Pont has a formidable array of patents in this field, but this wouldn't necessarily bar the entrance of other companies.

Du Pont may be more optimistic about market growth than its public statements indicate. Although the Delrin plant was stated to have 12-million-lbs./year capacity, it probably could be readily expanded—possibly to as much as 50 million lbs./year.

If this is so, it bodes well for ultimate lowering of price. Prospective producers will not be slow to visualize how a significantly lower price tag could boost consumption.

#### **Drugmakers Rally**

The U.S. pharmaceutical industry—which took another beating in last week's sessions of the Kefauver subcommittee hearing in Washington—is still seeking a means of self-defense against what its leaders regard as a "smear" attack.

So far, the nation's ethical-drug producers haven't hit on any sure-fire move to counter the "bad press" they've been getting out of these sessions. They tend to shun the suggestion that came last week from a West Coast advertising agency executive: pharmaceutical companies should tell their story to the public via consumer advertising.

Industry executives raised these points against that suggestion: (1) such advertising "might short-circuit the vital doctor-patient relationship; (2) its cost might have to be added to the price of each product.

Piecemeal Defense: Various tactics are being tried as partial defenses. Pharmaceutical executives have been accepting speaking engagements more readily than in past years, using appearances before civic and professional groups to explain the workings of competition, research and profits in their industry.

Companies have been sending their public relations staff members, in shifts, to attend sessions of the Kefauver hearing. Aim: to build into each company's over-all public relations plans a buttress against attacks.

The Pharmaceutical Manufacturers Assn. is preparing a questions-andanswers pamphlet that will be distributed to doctors, dentists and libraries. The pamphlet will be sold to companies for distribution to their employees.

But the industry's spokesmen, doing their best to stem the onslaught in the hearing sessions, have often been unprepared for what PMA Chairman William Graham calls the "wild and irresponsible charges" of the subcommittee's staff. Graham is president of Baxter Laboratories (Morton Grove, III)

Half-Night Hassle: In last week's set-to—which included one session that lasted until nearly 2 a.m.—industry leaders tangled with Senator Kefauver over whether drug prices are too high, and whether the industry is really competitive.

Austin Smith, president of PMA, contended that drugmakers need higher profits than many other manufacturers, if they are to make the research gamble worthwhile and provide a cushion against rapid obsolescence and other hazards of a highly competitive business.

Perhaps industry's most cogent argument is that, even if producers' profits were wiped out completely, savings to consumers would amount to only 3-4¢ on the dollar. And this would eliminate drugmakers' margins for experimenting and taking risks. Consumers, industry declares, would be the losers, because life-saving—and money-saving—drugs now in the offing would never reach production.



Glen Alden's List wants to line up chemical customer for idle coal mine.

#### **Ambitious Plan**

Now two proposals for producing chemicals from eastern Pennsylvania's anthracite coal reserves are in planning stages. Pushing these projects are Philadelphia and Reading Corp. and Glen Alden Corp., the two largest producers of anthracite. Prime motive: to create new markets for their anthracite, sales of which have slumped drastically in recent years.

Both projects figured in the news last week:

- Glen Alden's Chairman A. A. List disclosed that his firm is negotiating with "a major chemical company" on a proposed project near Wilkes-Barre. The chemical company would put up a \$15-million plant to utilize the carbon content of coal from Glen Alden's currently idle Loomis colliery at Nanticoke. Glen Alden would supply the coal—about 350,000 tons/year for processing, and an additional 150,000 tons/year for generation of the electrical power that would be needed.
- Philadelphia and Reading's President Howard Newman says his company intends to press ahead on its proposed power and chemicals complex for the Pottsville area (CW Business Newsletter, Feb. 6). P&R has formed a new subsidiary, Reading Chemical Corp.; is looking for "a topgrade chemical executive with a proved record of success in this field" to head up the new company; and is



P & R's Newman seeks qualified chief for new coal-chemicals subsidiary.

#### for Anthracite

"proceeding as rapidly as is consistent with sound practice toward the day when we can let contracts for engineering and construction." Principal products: synthesis gas, calcium carbide, acetylene, and derivatives.

Glen Alden's announcement naturally started a guessing game as to which chemical company is involved and what products are under consideration for the Nanticoke project. The coal tonnages mentioned could feed a large — say, 400-tons/day — ammonia plant. Such a plant — with additional units for producing other nitrogen derivatives — might cost something like \$15 million. But, of course, other operations might also jibe with the figures given.

Glen Alden—under economic pressure to make use of its anthracite because idle properties are taxed at the same rate as deposits being worked—says the chemical company insists on anonymity at this time. Harry Bradbury, president of Glen Alden's coal division, has said this much about the proposal:

The processes that would be used have already been proved feasible; further tests, on a larger scale, are now under way. Coke could be used for the operation, but right now anthracite has a price advantage.

The plant would abut the Susquehanna River, which would provide processing water.

#### Ahead: Spurt in Sales to Soviets

Soviet Russia and its European satellites are redoubling their efforts to buy U.S. goods and technology, including chemicals, chemical processes and chemical equipment. Object of the Reds' purchasing drive is to get material that will help them meet the growing pressure for consumer goods, while not running the propaganda risk of buying actual finished products with a "Made in U.S.A." label.

This is the conclusion U.S. trade analysts and export control officials have drawn from recent exports to the Communist bloc and applications for licenses to supply future exports.

While exports to the satellites did not rise appreciably during 1959 — remaining at about \$110 million— exports to the U.S.S.R. jumped to an estimated \$10 million. The yearly average over the previous three years was about \$3.5 million. The bulk of this increase came in the last quarter, as Intertex Corp. began making the first shipments on its \$30-million textile plant deal (CW Business Newsletter, Nov. 28, '59).

This year, U. S. sales both to Russia and to the satellites may jump 10-20%.

Export Swells: One indicator of the coming export upturn: during the last quarter of '59, the Commerce Dept. licensed \$30.5 million worth of goods for shipment to the Soviet bloc—the highest total in eight years. During the previous quarter, shipments worth only \$11.4 million were licensed, and this included equipment sales at the U.S. fair in Moscow.

Besides the \$17 million in equipment and technology for the Intertex plant, the fourth-quarter list includes isobutyl alcohol, valued at \$746,000, for the Soviet Union; \$690,000 worth of sulfur for Czechoslovakia; and \$420,750 worth of styrene monomer for the Soviet Union.

Moreover, Commerce gave advance approval for sales of millions of dollars in technology. If the interested U.S. companies win the contracts away from their European competitors, Commerce will license exports of technology for plants in such fields as plastics, pulp and paper, tire cord, manufactured gas, phosphoric acid, fertilizer and textiles.

Government officials make it clear

that, while these mounting figures may signal a shift in Soviet policy, they do not reflect a change in U.S. policy (see p. 7). In the fourth quarter, for example, applications for exports worth \$1.4 million were rejected. Included: fluorinated hydrocarbons, synthetic rubber, borax, polyethylene, molybdenum concentrates, ethylene glycol, ethylene oxide, maleic and phthalic anhydrides.

U.S. curbs on exports to Communist nations, although they are constantly being reviewed and rejuggled on an item-by-item basis, have not been generally liberalized since the fall of '58. At that time, the U.S. went part way along with the NATO powers and Japan in easing restrictions.

Earlier this year, this group's Coordinating Committee (COCOM), which sets the multilateral controls, again eased up on many items, including chemicals and minerals. But the U.S. did not go along, further widening the gap between U.S. policy and that of its allies.

The big increase in orders, therelore, is entirely accounted for by items that have been readily available to Communist buyers in the past, but have had few takers.

Good Pickings: Meanwhile, western European producers of chemicals and equipment continue to benefit from U.S. companies' handicap in dealing with the Communist bloc.

The Federation of British Industries, for example, has just signed its second trade agreement with East Germany, calling for an exchange of goods in each direction worth some \$19.6 million during '60. One of the first shipments from the U.K. will be a 40,000-tons/year ethylene plant, which will be provided (along with engineering) by Humphreys & Glasgow Ltd. and Petrocarbon Developments Ltd. Other sizable chemical deals-e.g., know-how for a polyethylene plant - are expected to follow, as part of East Germany's efforts to double chemical output during the next five years.

Under another new pact, Italy will supply Russia with chemical and petrochemicals equipment, synthetic rubber, man-made fibers, textiles, and pharmaceuticals.

#### German Exports Rise

West Germany's "Big Three" chemical producers are still pacing the country's rapid chemical growth, with exports providing a hefty push.

For Farbenfabriken Bayer, West Germany's largest producer, sales jumped 22% in 1959, to \$585 million. Exports spurted 26%, now account for about 43% of sales. Bayer's biggest sales increase was in plastics and materials for plastics production—their volume rose 30%. This year, Bayer's tonnage output is expected to rise 10% as new facilities come onstream.

Badische Anilin- & Soda-Fabrik holds second place, having increased sales 17.6%, to \$540 million, in '59. Exports were up 20%, to \$205.2 million — 38% of sales.

Farbwerke Hoechst also registered a 17.6% gain, to \$529 million. Exports — 32.4% of the total—were up 22.9%.

Sales of the entire West German chemical industry increased an average of 13% in '59.

New investments will help keep the big I. G. Farben successors growing. Last year each spent \$60 million on capital expenditures. This year Bayer plans to spend \$72 million, BASF, \$71.4 million, and Hoechst, \$78.6 million

#### 'Guidance' for Industry

The cause of free enterprise in Cuba took another body blow last fortnight when the government decided to tuck all private business under the wing of a new "central planning board."

The new unit, to be headed by Premier Fidel Castro, will guide companies along the prescribed channels of the planned economy that seems to be developing at breakneck speed. Exactly how it will work is still as unclear as many of the other regulations the government has been grinding out in its one-year existence.

At the same time, in a separate decree, the Cabinet ordered that all pharmaceutical products sold in Cuba must be packaged or repackaged locally for consumer sale. This will hit European producers exporting to Cuba harder than it will U.S. pharmaceutical companies. Most U.S. drug companies that make significant sales to

Cuba do so through local subsidiaries, which usually do their own packaging and sometimes compounding.

But even local packagers have been feeling the economic crimp. To preserve foreign exchange, Cuba has clamped down on imports. This has caused a shortage of bottles, vials and other packaging materials.

#### U.K. Monopoly Probe

Britain's fast-growing and highly concentrated chemical fertilizer industry has come out of a Monopoly Commission investigation with an almost clean bill of health.

The industry is dominated by three big companies — Imperial Chemical Industries Ltd., Fisons, Ltd., and Potash Ltd. The commission, set up in 1948 to probe monopolies in industry, finds that the degree of monopoly in various segments of the chemical fertilizer industry does not act against the public interest.

But the report alleges that profits made in the past by Fisons have been too high.

In 1957-58 Fisons supplied about 43% of total British superphosphate sales, 40% of basic slag sales, 43% of sales of compound fertilizers included in the inquiry, and was ICI's chief customer for ammonium sulfate and Potash Ltd.'s chief customer for potash used in making potassium compounds.

The report prompted the immediate statement by Fisons' chairman, Sir Clavering Fison, that the company was satisfied with the findings, and that during the past two years Fisons had trimmed prices so that profits are in line with recommendations.

The report notes that Potash Ltd. — with 76% of the U.K. potash market in 1957-58—has a monopoly position in channeling French, West German and Spanish imports. It says that recent results of competition from East Germany indicate that U.K. buyers would benefit from still more competition. It urges the government to work with ICI and Fisons in developing a stronger bargaining position with overseas potash producers.

ICI emerged from the inquiry unscathed, even though this company and a subsidiary, Scottish Agricultural Industries, supplied about 74% of total nitrogen fertilizers sold in Britain during 1957-58.

#### Coal-to-Oil Shift

Japan's burgeoning petrochemical industry last week learned that it's going to gain an important new member. Ube Kosan — a major coal producer — revealed plans to convert half of its fertilizer capacity to the use of petrochemical feedstock.

If it gets government approval, Ube will spend \$22 million on the program: The company plans to produce 21,000 tons/year of ethylene, 20,000 tons of polyethylene, and 5,000 tons of polypropylene. Contract negotiations are under way with Scientific Design and Montecatini.

Feedstock will come from Maruzen Oil's Matsuyama refinery.

Meanwhile, Japan's already-established petrochemical producers are boosting their stakes in the industry. Mitsui Chemical, which spent only about \$600,000 on capital investments in 1959, plans to spend some \$5 million this year. It is about to hike polyvinyl chloride production this spring by 375 tons/year to a total output of 1,240 tons. Mitsui also plans to go into bisphenol production, under a license from Hooker, pending government approval.

Toyo Rayon, another member of the Mitsui "zaibatsu" boosted capital investments from \$22.5 million in fiscal '58 to \$40 million in fiscal '59. It is now building a 13.5-tons/day nylon plant at Okazaki.

Mitsubishi Chemical doubled capital expenditures, from \$4 million in '58 to \$8 million in '59. Last November, Mitsubishi completed a \$1.5-million expansion of its acrylonitrile plant. bringing total output up to 900 tons/month. Now it will invest \$4 million in a second 900-tons/month acrylonitrile plant, under a technical licensing agreement with Sohio.

Also slated to go onstream: a 500-tons/month diethylhexanol plant and a 150-tons/month isobutanol plant. Both will use propylene supplied by Mitsubishi Petrochemical.

U.S. participation in Japan's petrochemical growth has thus far been limited primarily to providing technology — largely because of the government's policy against allowing foreign control of Japanese industry. That policy is now changing in response to the government's desire to build up industry and go after export markets (CW, Feb. 6, p. 19).

#### COMPANIES

**United Carbon Co.** is building a \$2.5-million office building and laboratory just outside Houston, Tex. Research personnel and most of the company's operating units will be located on the 32-acre site.

Dayton Rubber Co. (Akron, O.) plans to acquire assets of Metal Hose and Tubing Co. (Dover, N.J.), rubber hose manufacturer with its own line of reusable steel and brass fittings. Consummation of the agreement is expected this month.

Walter H. Hindle, Inc., is the name of a new chemical and textile consulting company; offices will be in New York. The firm has been retained by Air Reduction Co., as consultant on development of polyvinyl alcohol fiber.

#### EXPANSION

Ethylene Oxide: Union Carbide Canada, Ltd., has embarked on a multimillion-dollar expansion of its Montreal East plant. Capacity for producing ethylene oxide and derivatives will be doubled; on completion (in the first quarter of 1961), the plant will be one of Canada's largest chemical complexes. Polyethylene expansion (begun in 1959) at this location is slated for completion late this year.

Inorganic Chemicals: Vitro Chemical Co. (Salt Lake City) will close its Canonsburg, Pa., plant and transfer equipment and production to Chattanooga, Tenn. Object: to expand research and production. Inorganic chemicals (including nickel salts) produced at Canonsburg will be added to the line of thorium and rareearth chemicals, magnesium alloy and polishing oxides produced at Chattanooga.

Aromatics: Tennessee Gas Transmission Co. (Houston, Tex.) will add a 2,000-bbls./day aromatics unit to its Bay Petroleum Co. refinery (Chalmette, La.). The new installation will include a catalytic reforming unit, extraction plant, and facilities for separation and distillation of aromatics. Completion target: spring '61.

Liquid Asphalt: Imperial Oil, Ltd. (Edmonton, Alta.), is constructing a 100,000-bbls./year liquid asphalt plant to be completed by June. The \$210,000 venture supplements the company's 280,000-bbls./year plant for solid asphalt completed last year.

**Refractories:** Electro Refractories & Abrasives Corp. (Buffalo, N.Y.) has approved a \$250,000 expansion and \$90,000 modernization program for its plant at Lackawanna, N.Y. This will be the first phase of a three-year, \$550,000 program.

Paper: Bowaters Mersey Paper Co. has budgeted \$3.5 million to be spent over the next three years for modernization of the electrical system of the Liverpool, Nova Scotia, plant. Newsprint capacity: 150,000 tons/year. Project plans have been completed by Bowaters Engineering and Development, Inc. (Calhoun, Tenn.) The new system will be served by a 66,000-kva. substation to be built by Nova Scotia Power Commission.

#### FOREIGN

Tetracycline/India: Its patent dispute with the government's Hindustan Antibiotics resolved (CW, Feb. 13, p. 23), Pfizer is going ahead with construction of a tetracycline plant. A subsidiary, Pfizer-Dumex, is handling the project. Reported cost: \$1.5 million. Output: 5 tons/year. There will be no Indian participation in the project. This marks a change from usual arrangements for foreign ventures in India.

Melamine/England: American Cyanamid's English subsidiary will build a 6-million-lbs./year melamine plant, due onstream early next year at its Gosport site.

Potash/Israel: Israel's Dead Sea Works plans to raise potash production to 500,000 tons/year, and is considering production of industrial-grade potash and table salt. The increased output will be aimed at Asian and African markets.

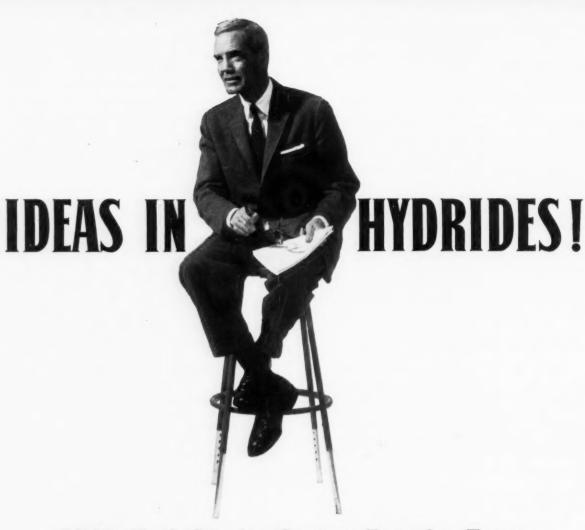
Caustic Soda, Chlorine/Vietnam: Lien Phat Hang, a Taiwan-Vietnamese firm, will invest more than \$500,000 in a plant in South Vietnam to produce caustic soda, chlorine, hydrochloric acid and bleaching powder.

**Polyethylene/Denmark:** A 10,000-tons/year polyethylene plant and units to produce raw materials for synthetic rubber will be built at the Maersk refinery near Copenhagen. Tariffs on these products will be raised from 0-5% to 10%.

Refinery/Panama: Refineria Panama SA, a joint venture of Continental Oil Co. and National Bulk Carriers, will build Central America's first oil refinery, a \$30-million unit to go up on Payardi Island, Panama, near Colon.

Polyethylene/Netherlands: Dutch State Mines plans to triple polyethylene capacity, and is reported negotiating a contract with Esso to supply light naphtha for feedstock.

**Paint/Netherlands:** Ferro Corp. will build a second plant in Holland to produce paints and enamels for the ceramic and plastic industries.



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### Washington

#### Newsletter

CHEMICAL WEEK March 5, 1960 Tighter rules on labeling of hazardous products for home use may be in store. A proposed "Federal Hazardous Substances Labeling Act" now moving through Congress has the backing of industry and public health authorities. Last week the bill got bipartisan support when the Senate Interstate Commerce Committee unanimously approved it.

The bill, S. 1283, would require that all household substances that are toxic, corrosive, irritating, flammable, strong sensitizers, or which contain radioactive substances, must be conspicuously labeled. The Secretary of Health, Education & Welfare would administer and enforce the new law.

Products already covered by other laws would be exempt. This includes product labeling under such laws as the Food, Drug and Cosmetic Act and the Insecticide, Fungicide and Rodenticide Act.

Support for the new proposal is broad. It rests primarily on such statistical evidence as the committee's estimate that more than 5,000 children die each year from eating or drinking bleaches, detergents, furniture polish, scouring agents, etc.

Labels would be divided into three categories. Substances that are extremely flammable, corrosive, or highly toxic would have to be labeled "danger." Highly toxic substances would also have to carry the word "poison." Labels for all other types of hazardous substances would say "warning" or "caution."

In addition, specific dangers—e.g., "causes burns"—inherent in each substance would have to be stated. Labels would identify each hazardous substance by chemical name and include directions for necessary first-aid treatment.

Penalties for misbranding or handling misbranded packages include seizure, and fines of \$500 and/or 90-day jail terms for first offenses, and up to \$3,000 and/or one year in prison for subsequent offenses.

Construction of sewage treatment plants will be limited this year to about 500 projects. Failure of the House to override the President's veto of a bill to double federal grants means that states will get about the same amount of money this year as last—\$45 million. Allotments will range from \$338,000 for Delaware to \$2.9 million for Pennsylvania.

Available funds are distributed to states according to population and wealth. States then determine which projects get the money. Two of the bigger systems slated for construction this year are New York and Detroit.

#### Washington

#### Newsletter

(Continued)

The President has vetoed 158 bills since he took office and has sustained them with a perfect record except for one "pork barrel" bill last year. The water-pollution bill fell short of the necessary two-thirds by 22 votes. If 11 more Republicans had defected, the bill would have gone through. Only 15 Republicans voted to override, in spite of strong pressures from home.

Senator Dirksen's effort to stymie the drug price hearings has angered some committee members. The GOP floor leader has objected to holding the hearings while the Senate is in session—which means just about all day every day during the civil rights fight. He says he doesn't want to miss either show. But in fact he seldom shows up at the drug probe. His real reason is that he thinks the hearings are biased against the industry. Committee Chairman Estes Kefauver (D., Tenn.) ran one session last week until 2 a.m. to defeat Dirksen's objective. The midnight session not only kept senators and staff up late but served to dramatize the hearings (see p. 24).

Conventional fuels would be used in a secret new airplane now under study by the Air Force. It's code-named "Dromedary," is a reversal of the trend away from manned bombers.

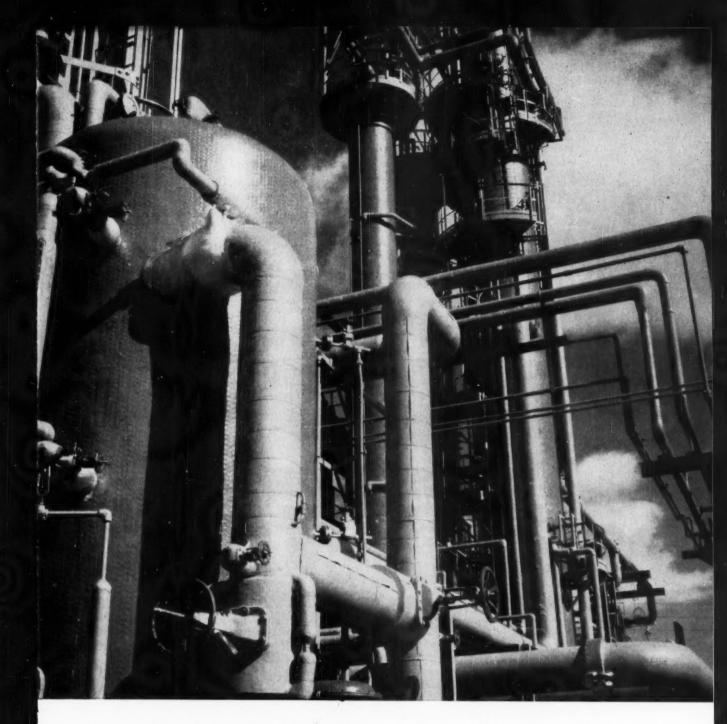
As now conceived, the "Dromedary" would be a slow-flying plane with conventional jet engines. It could stay in the air 10 days and would be, in effect, a reliable low-performance flying missile platform. Reports are that Boeing and Northrop are in on the work.

Rules to carry out the new industrial security program will be issued soon by the Pentagon and other defense agencies. Key points in the new program ordered by the White House: right of company employees who are denied a security clearance to find out why, to face their accusers, and defend themselves against charges of being security risks. Sole exception: if the accuser is a confidential government agent.

Chemical and other companies handling classified work must get security clearances for all employes involved.

The Manufacturing Chemists' Assn.—which joined in a blast at the Atomic Energy Commission's activities, charging AEC's job could be done by private industry—now says the commission "is cooperating with private industry in a commendable manner."

In a letter to Congress, MCA acknowledged the difficulties pointed out by AEC in turning over to private business those projects in atomic energy where "national defense is of paramount importance." But MCA still insists that private industry should get more AEC contracts in such areas as reactor fuel and uranium metal for nuclear submarines.



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design (dē zīn') n. A plan; pattern; purpose. Syn. Aim, intention, purpose. A design is something skillfully and methodically planned; it requires time and study

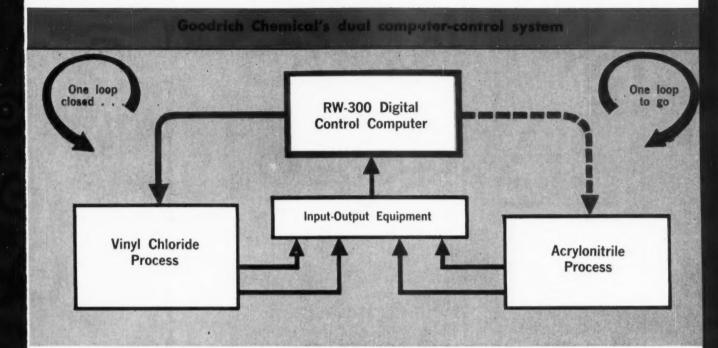


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# ENGINEERING



# **Control Computer Readies for Double-Duty**

First details of B. F. Goodrich Chemical's \$225,000 computer-control system at Calvert City, Ky. (CW Technology Newsletter, Jan. 16, p. 61) came to light last week at a local meeting of the Chicago section of AIChE. Goodrich development man James Madigan reported that the company's new RW-300 computer is now operating in the control loop of a vinyl chloride process, will soon take on a similar process supervision of an acrylonitrile plant.

On the basis of only six weeks' operation, cautioned Madigan, BFG can't claim to have all the answers to process control by computer. However, the system has proved more reliable than was anticipated, has been operating within the company's tolerance of 0.1% accuracy. Up to 80% of the control functions planned for the vinyl chloride unit are now under automatic supervision; the acrylonitrile control loop is expected to be completed as soon as current component evaluation tests are completed.

Automated control of the vinyl chloride process at Calvert City was a rather bold first step into process automation because the process itself is new to this country. (The process is known to be of German origin, but Madigan referred to it only as a "thermal pyrolysis of ethylene dichloride to yield vinyl chloride and hydrogen chloride.") Most computer-systems experts have recommended the more cautious approach of adding the control computer to an existing process that's well known, less susceptible to operating upsets.

Computer Schedule: Heart of BFG's computer system is a master program—the "executive routine"—which is in full charge of the facility's time schedule. The master program calls for the computer to continually monitor a digital clock and initiate the following duties in their proper time interval:

- Every five minutes, starting on the hour, the computer scans all of the 128 instrument input signals from both processes. Normal values are converted into appropriate units and stored in a magnetic-drum memory unit. Off-normal readings are automatically printed in red on a computer-operated typewriter.
- Every 20 minutes, starting at 10 minutes past the hour, the system

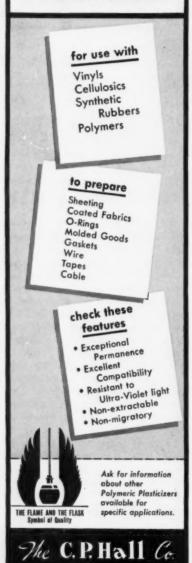
computes control equations by which reactor feed rates and heat inputs can be adjusted to maintain constant conversion at optimum value. In addition, this 20-minute control program regulates part of a distillation train by determining which way to adjust temperature control set-points on the distillation columns. Result: output of "in-specification" product is maintained with minimum losses.

- Every hour on the hour the computer system logs all variables of both processes—instantaneous temperature and pressure readings, hourly averages of the five-minute scans on flow readings.
- Every eight hours, starting at 12:05 a.m., the computer calculates a new optimization program to compensate for variables—such as uncontrollable variations in feedstock purity, adjusted production goals—which affect optimum feed rate and conversion conditions of the pyrolysis reactor. This eight-hour optimization program is designed to meet—but not to exceed—monthly production goals, sets the requirements for 20-minute control-equation calculations.
  - Once a day the computer runs



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### ENGINEERING

off a daily log on both processes, including totalized flows, calculated efficiencies and new correlation constants. This daily log, together with the hourly log of operating variables, said Madigan, is expected to be key engineering aid in extending the computer's utilization beyond initial goals.

Part-Time Routines: Although the executive routine takes precedence over all other operations, the Calvert City control center can also handle unscheduled computations on an available-time basis. Normally, the RW-300 spends the intervals between timed duty cycles for checking its own operation. But the control room supervisor can obtain a complete log (complete readout of the latest scan) or summary scan (complete listing of off-normal instrument readings) on demand. Predetermined changes, such as alarm scanning limits, adjusted production goals, etc., can be introduced via punched cards.

To date, BFG engineers have also utilized the RW-300 to make calculations on any of four standard analyses for an off-line mass spectrometer at the plant. For this job. the computer is required to solve up to 29 sets of simultaneous equations. The longest analysis takes three and one-half minutes, fits well between five-minute scanning cycles. These problems previously had to be sent to BFG's development center at Avon Lake, O., said Madigan. Now the computer system affords the added advantage of getting problem solutions sooner during critical periods of quality-control difficulties.

Acrylonitrile Loop: Control problems in the acrylonitrile unit are quite different from those encountered in the vinyl chloride plant, come closer to the requirements suggested for early computer-control application: the process consists of a series of catalytic reactors, each with unique operating characteristics. The computer will be required to adjust operating conditions to suit the needs of each individual reactor. Inputs will include several variables from each unit, plus an onstream chemical analyzer time-shared by all of the reactors.

The versatility of the digital computer in terms of flexible and inventive programing is essential, said Madigan, because of "the sea of ignorance which surrounds the basic mathematics of most chemical processes."

The limitations on successful application of this type of equipment, he concluded, lie with technical inventiveness and imagination—not with basic capabilities of today's computer hardware.

# **Building on Diamonds**

Engineering Supervision Company, a subsidiary of F. H. McGraw & Co. (New York), this week took the wraps off the world's "first" machine to create ultrahigh pressures for commercial applications.

Samples, varying from tetrahedrons about 1 in. to a side to cubes 15 in. to a side or shapes 2 in. in diameter by over 1 yd. long, can now be subjected to pressures of 1.5 million psi. and 5000 F—conditions at which carbon is converted into diamonds.

The new machines, however, have many potential applications in addition to synthetic diamond fabrication. In sizes now available, they will be used to improve the properties of metals, fabricate alloys and now-unknown chemical compounds, produce phase transformations (other than converting carbon into diamonds), and compress powders to form new materials.

They will do these jobs on commercial-scale batch processes; and their cost—\$10,000 to \$100,000 per machine—brings ultrahigh-pressure processing within reach of chemical manufacturers and medium-size research laboratories. ESCO has already sold seven of the machines: one to the Air Force, one to Cambridge University (England), three to defense agencies and two to unidentified chemical companies.

Question of Size: To those unfamiliar with the problems of creating ultrahigh pressures on a large scale, the significance of this breakthrough may not be apparent. Although synthetic diamonds have been produced by several companies (CW Technology Newsletter, Dec. 5, '59), extreme-high-pressure processing is still a very young commercial operation. Yet the new machines are the culmination of over 20 years' intensive development research.

The first machine was made by P. W. Bridgman for basic research

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### ENGINEERING

on ultrahigh pressure. A laboratory machine, it was a simple ram- and cylinder-device, which could treat a wafer-thin sample about ½ in. in diameter. Successive developments overcame mechanical problems of stress concentrations in the anvil and retaining cylinder.

In 1958, GE purchased one of these machines from ESCO to attempt the first commercial application of ultrahigh pressures. It succeeded in making synthetic diamonds of 6-8 carats. Selling diamonds at \$3 per carat, GE is reported to have grossed about \$25 million last year.

This basic industrial machine solved many technical problems besides the mechanical problems of concentrated stresses and alignment. For one thing, it required a material to surround the pressurized pieces, a pressure-sealing material which would be solid under normal conditions but become liquid when placed under ultrahigh pressure. These properties were found in volcanic lava—specifically, Tennessee Grade A lava.

The problem of heating the pieces under pressure was solved by electrical tabs at the sides of the specimen. And the hardness and strength needed for the pressure-producing anvils was found in tungsten carbide.

Finally, there was the danger that heat would be conducted from the extremely hot pressurized specimen into the tungsten carbide anvils, causing them to warp. Fortunately, the volcanic lava solves this one, too, provides sufficient insulation during the three- to five-minute batch compression process to prevent overheating of the anvils.

Commercial Problem: In spite of its success at making diamonds, the type of machine sold to GE was too bulky to allow commercial compression of large specimens. A tetrahedron specimen slightly longer than 1 in. to a side requires a machine mounted in a pyramid-shaped frame over 8 ft. in diameter; a frame to compress 12-in tetrahedrons comes to over 90 ft.

It is here that ESCO made the breakthrough. With their new design, a 1-in. tetrahedron can be compressed in a machine about 2½ ft. in diameter. Key: a pressurized sphere. The hinged anvil compression head is replaced by four tungsten carbide

pyramids with their apexes cut off. The ratio of the outer surface to the inner surface is about 50 to 1, so that pressure exerted on the base is multiplied 50-fold on the specimen.

The tetrahedron formed by the four pyramids is enveloped in rubber and suspended in water in a sphere. When the water is pumped to a pressure of 30,000 psi., the 50-fold increase exerts a pressure of 1.5 million against the specimen. At this pressure, the volcanic lava forms a massive support for the pyramid-shaped anvil. It liquefies at the center and leaks out between the edges of the anvils, but freezes at the lower pressures at the sides of the anvils to seal in the specimen.

Applications: Since ESCO's new machines are the first to allow large-scale fabrication at ultrahigh pressures, their commercial outlook is necessarily vague. But research points to some important uses:

 By compressing and simultaneously heating, the tensile strength of metals can be increased from 100 to 10,000 times without sacrificing their ductility.

• Strikingly new alloys—e.g., of titanium and magnesium—and new compounds, such as "metallic" hydrogen fluoride or "metallic" hydrogen, will be formed.

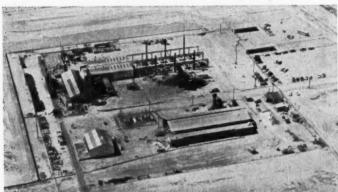
• Metallic powders (CW, Feb. 27, '60, p. 95) can be compressed to within 99.8% of their theoretical density, whereas other methods can compress them to only about 93% of this

 Phase transformations caused by altrahigh pressures can produce materials other than gems; for example, aluminum oxide powder can be compressed to a glasslike material that is very strong and transparent to infrared rays.

• At 1.5 million psi., the electrical conductivity of some metals is increased as much as 400%. Thus it may be possible to produce the low-temperature phenomenon of superconductivity at room temperatures.

Although the list of possible commercial applications could go on indefinitely, proved commercial applications are limited to gem production. However, five of the seven machines already sold are \$60,000, 5-cu.in. research models that will likely probe the commercial feasibility of other pressure-produced materials.

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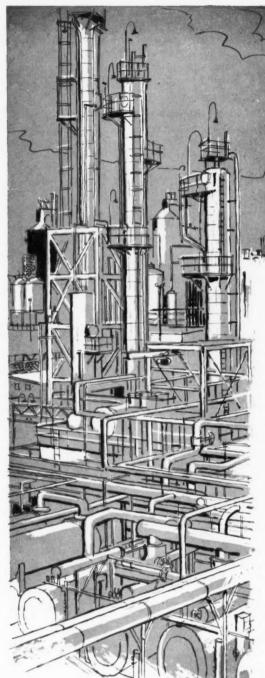
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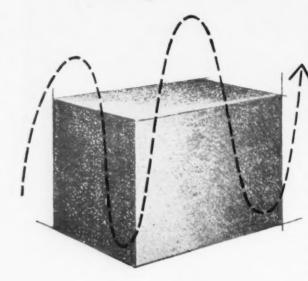
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# ADMINISTRATION



OM's Wolf, typical of industry's new look in overseas managers, observes Hong Kong office location.

# Bright Young Man's Happy Hunting Ground

"Not too long ago, we sent a man abroad to unload production we couldn't sell in the U.S. A foreign assignment was an executive dumping ground. Today it's a happy hunting ground for our bright young men." With this candid admission, a veteran international-division manager last week underscored a dual trend that is changing the look of the CPI's foreign operations.

Companies are being more selective in filling foreign posts, at the same time are sending relatively fewer Americans abroad.

Behind the trend are four factors: (1) Companies are responding to burgeoning foreign nationalism by reducing the number of Americans supervising native employees. Americans now average less than one individual for each 100 foreign workers.

(2) The nature of foreign operations has broadened to include full-scale production and marketing, as well as exporting. The increasing complexity poses a demand for men from upper management levels, men with

broad experience in the company.

(3) Accumulated experience overseas has shown the need for betterdefined qualifications and training goals—although companies disagree on what they should be.

(4) Many firms are now selecting high-caliber managers for overseas jobs—pressuring still more companies to send men of similar grade.

Man with a Job: Take the case of Herbert Wolf (above), who is just taking over as regional vice-president of Olin Mathieson's new Far East, Ltd. As the subsidiary's managing director located in Hong Kong, Wolf will be responsible for manufacturing and sales in 16 Eastern countries for OM and its E. R. Squibb Division.

Stocky, rapid-talking Wolf, at 49, has 33 years' experience with pharmaceutical companies. In '58, after three years with OM, he joined the company's International Division—not only as general manager for pharmaceutical and consumer products, but also as a "trainee" for overseas assignment.

"Trainee" Wolf was earning a solid five-figure salary, which is an indication of how serious OM is about its overseas goals. In two years of training, Wolf was intensively exposed to aspects of management he had missed along the line. Moreover, he traveled extensively, putting his language facility and recognized adaptability to use, preparing himself for the assignment.

Selection Techniques: Not all of OM's trainees are high-priced men. In addition to "senior trainees" like Wolf, both basic and intermediate trainees are being groomed for jobs in South America, the Far or Middle East and Europe. They are recruited from both inside and outside the company.

It's not easy to find good men. Personnel men responsible for international employees estimate they examined over 100 candidates to select the four basic trainees there now. A. T. Zotta, vice-president of OM's International Division, says he spends some \$150,000 annually for selection and

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# ADMINISTRATION

training in the division.

Prerequisites: Although experience qualifications are spelled out by most companies, they find that intangible catch-alls like "adaptability" and "initiative" play a major part in selection. How a man can live and work in a foreign country—and how his family will adapt—are decided well before his broad on-the-job training and formal language classes begin. Most firms look for candidates who have had some preparation (e.g., travel or special study) for overseas work.

For example, says Oronite Chemical Co. President T. G. Hughes, "We choose men who are natives of, or extremely familiar with, the country in which they'll work. The same qualities that are necessary for similar positions in this country are also necessary for managerial jobs abroad. A thorough understanding of local conditions, language and customs of the country are an added necessity."

There are a variety of ways to measure a man's fitness for overseas assignment. Fish Engineering Corp. (Houston, Tex.) requires police letters—certifying no criminal records—and psychological exams before sending a man abroad. Vick Chemical Co. looks for a businessman with broad interests, rather than a specialist. Merck & Co. takes the view that while language, technical knowledge or general company experience may be prerequisites to one job, they may not be to others.

Training Data: Few companies have as formal a training program as OM, but most give candidates some preparation. The same flexibility which applies to selection at Merck holds true in its training. Merck, with about 25 Americans permanently abroad, tries to prepare the man to understand the culture, language and job he will face. Training varies within the limits of the job, and the time available.

The company sends some candidates for six weeks of intensive language instruction. Language schools in New York City are sometimes used, or courses are set up at the company's international headquarters in New York.

Outside authorities and foreign nationals conduct seminars, and a bibliography is provided. Antonie Knoppers, president of the Merck Sharp & Dohme International Division, stresses "attitude before aptitude" in

choosing international personnel. And each person going abroad receives an "international understanding kit"—a collection of pertinent literature—designed to help him study and analyze democracy vs. communism.

Monsanto Chemical Co. stresses knowledge of the company and its programs and requires basic French and German—or a willingness to learn—of its technical men. Du Pont provides language training and cultural adaptation for the whole family, but usually after representatives are settled in a country. Additional training methods are now under study at Du Pont.

No Ugly Americans: At least one company has sliced its American overseas staff to the bone. Reichhold Chemicals has only one American abroad, even though it is represented in 23 countries and its international interests are growing. Herbert Helbig, vice-president of Reichhold's International Division, says he thinks part of the company's success in other countries is a result of such policies, designed to minimize native resentment. Helbig also thinks Americans overcolonize when abroad, suffer from their own isolation. They cluster together, fail to develop contacts with their native neighbors, he declares. Result has been resentment directed toward some firms.

All companies checked by CHEM-ICAL WEEK try to train and use nationals as much as possible. American Cyanamid, with one exception, staffs all foreign companies, up to the post of general manager, with native personnel. It has only eight American regional managers permanently abroad. Rising nationalism, scornful of industrial "colonization," is the chief obstacle to sending more Americans abroad. Fortunately, foreign countries are now developing qualified industrial personnel to take over important supervisory jobs.

More Change Ahead: As the percentage of Americans going overseas decreases and foreign jobs become more demanding, selection and training will become more rigorous. Already competition for qualified men is fierce, and pirating is not uncommon.

OM's Zotta puts it this way: "The needs of overseas operations are picking up faster than talent is becoming available. That's why we're developing our own."



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### ADMINISTRATION

# LEGAL

Pre-empted Police Powers? Wisconsin's supreme court has ruled that a current federal antitrust investigation of three chemical companies does not bar the state from pressing price-fixing charges against them.

Wisconsin's attorney general has charged the companies with fixing a price for calcium chloride and submitting identical bids to government units.

The ruling upsets a lower court order—sought by three companies—that would have denied Wisconsin jurisdiction in the case. The lower court ruled that the Federal Trade Commission entered the investigation first, thereby pre-empting the state's rights. Firms seeking the dismissal were Dow Chemical Co., Wyandotte Chemicals Corp. and Columbia-Southern Chemical Corp. State charges are pending against a dozen others.

The supreme court based its unanimous decision on interpretation of federal and state laws dealing with conspiracies and monopolies, saying, "The action by the FTC does not amount to a pre-emption and does not preclude the state from acting under its police powers in the making and enforcement of the state statutes."

It agreed with the state's contention that although the companies are engaged in interstate commerce, they had violated Wisconsin—as well as federal—law by fixing prices.

Companies which did not move for dismissal of state charges in the lower court are Allied Chemical Corp., Pittsburgh Plate Glass Co., Du Pont, Merchants Chemical Co. and eight Wisconsin firms.

Drug Fine: A Philadelphia drugtesting firm and its chief officer were found guilty and fined last week for "causing adulterated drugs to be shipped in interstate commerce" in violation of the Federal Food, Drug and Cosmetic Act. The firm certified labels that presented inaccurate information on drug strength. Subsequent checks found the drugs to be less potent than labeled.

A fine of \$1,000 was imposed on Eugene L. Cohen, president of Harvey-Pittinger, Inc., and the Wyanel Laboratories by District Court Judge Francis L. Van Dusen. The defendants pleaded no defense to five counts of a 10-count criminal information filed on Jan. 7. Harvey-Pittinger, under the judge's sentence, must submit periodic reports of its tests to FDA for a period of three years.

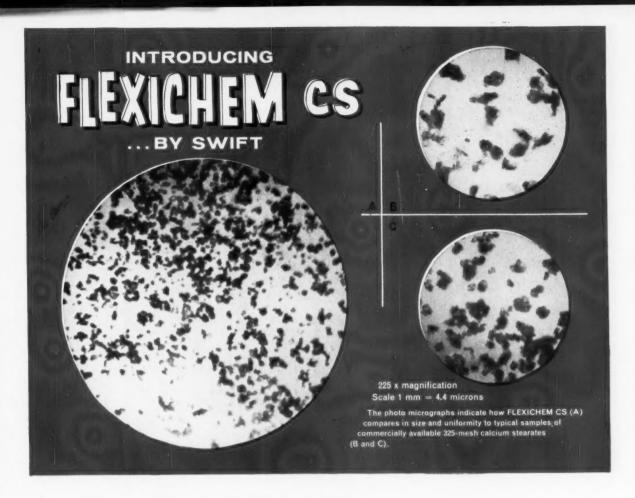
Salt Fix: A federal grand jury investigation of pricing policies of firms supplying rock salt to the city and county of Milwaukee got under way last week with testimony from the first witnessess. The investigation stems from charges against six salt producers and a trade association that identical bids for the salt were made to the two government offices. The companies and trade association involved are Morton Salt Co., International Salt Co., Diamond Crystal Salt Co., Barton Salt Co., Carey Salt Co., United Salt Corp. and the Salt Producers Assn. The investigation is expected to take about a year.

# LABOR

Strike Over: A 34-day strike by production and maintenance workers at the Calvert City, Ky., plant of National Carbide Co. has ended with ratification of a new, two-year contract. The workers are represented by Local 7-556, Oil, Chemical & Atomic Workers Union. The contract calls for an immediate 10¢/hour increase in wages and fringe benefits amounting to about 31/2 ¢/hour. Also agreed upon: an 8¢/hour increase during the contract's second year. Included is a limited cost-of-living increase that permits the contract to be reopened on the wage issue, provided that cost-of-living increases more than 3% during the first 20 months.

Election Order: A union representation election has been ordered by the National Labor Relations Board at the Hampton, S.C., plant of Reichhold Chemicals, Inc. The choice will be between no union, the International Union of Operating Engineers, the International Chemical Workers Union, and the Teamsters Union.

NLRB has stipulated that the plant's truck drivers will be the only ones with a choice among all three unions. If they do not choose the Teamsters, their votes will be pooled with ballots of nontruck-drivers.



# New, extra fine calcium stearate promotes surface coverage

FLEXICHEM CS is a new impalpable calcium stearate of such fine particle size that it defies measurement by usual screening methods. Its average particle size is 5 to 7 microns while maximum size will range to only 20 microns.

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FLEXICHEM is Swift's trade name for a new family of "light" metallic complexes made possible by a new simplified reaction process. The benefit of Swift's development experience in utilizing these new stearates is available to serve you. Write for details.

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Type of sait:

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Color: White

Formula: Ca (C18H35O2)2

Odor Bland

Bulk density: 20 lbs. per cu. ft.

Melting point: 147°-149° C. Moisture: 0.6%

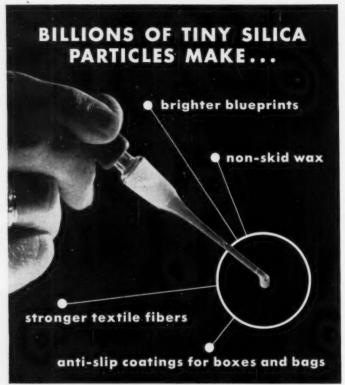
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Solubility: Insoluble in water, alcohols, esters and ketones. Slightly soluble in hot benzene, toluene, xylene, carbon tetrachloride, vegetable and mineral oils. Soluble in hot pyridine.

For further details, write for Bulletin 42.



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# ADMINISTRATION

# KEY CHANGES

Carl H. Rasch to president, Montgomery Rasch to vice-president and Roy L. Suitor to vice-president, sales, Riverside Chemical Co. (North Tonawanda, N.Y.).

A. C. Stewart and W. C. Kaesche to board of directors, Collier Carbon & Chemical Corp. (Los Angeles).

**David H. Bradford, Jr.,** to board of directors, Mid-South Chemical Corp. (Memphis).

Harlow J. Reed to vice-president, engineering, Olin Mathieson Chemical Corp. (New York).

Morton Surkin to executive vicepresident, Hexagon Laboratories, Inc. (New York).

Ralph Falk II to senior vice-president, Baxter Laboratories, Inc. (Morton Grove, Ill.).

Robert Cosgrove to vice-president, operations, D. B. Kinkaid to vice-president, marketing, and George Ward to vice-president, research, Dawe's Laboratories, Inc. (Chicago).

David B. Hatcher to executive vice-president, Stepan Chemical Co. (Chicago).

**Donald C. Oskin** to vice-president, executive sales, Chemical Division, Food Machinery and Chemical Corp. (New York).

Ray C. Smith to vice-president and board of directors, Sinclair Petrochemicals, subsidiary of Sinclair Oil Corp. (New York).

Robert P. Russell and James J. Minot to board of directors, Cosden Petroleum Corp., subsidiary of W. R. Grace & Co. (New York).

Marvin Teakell, L. T. Massey and F. L. McConnell to board of directors, Conco Chemical Co. (Dallas).

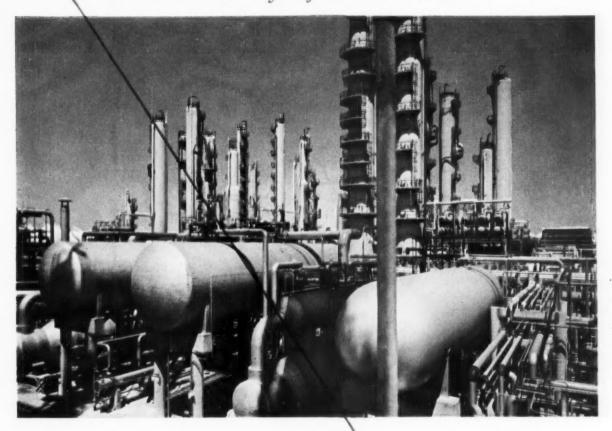
John J. Ziccarelli to general sales manager, newly formed Plastics and Chemicals Division, National Cleveland Corp. (Bridgeport, Conn.).

### DIED

Kenneth A. Spencer, 58, founder and chairman of the board, Spencer Chemical Co. (Kansas City, Mo.), at Miami Beach, Fla.

Chemical Week . March 5, 1960

# tank-car delivery of DIISOBUTYLENE



Now in its third successful year of volume production, this Petro-Tex trimethylpentene finds important use in detergent intermediates, anti-oxidants, etc. But its reaction possibilities—such as chlorination and hydrolosis to isooctenyl alcohol—are far from fully explored.

Petro-Tex Diisobutylene has a uniquely interesting combination of properties. It is a clear water-white mixture of

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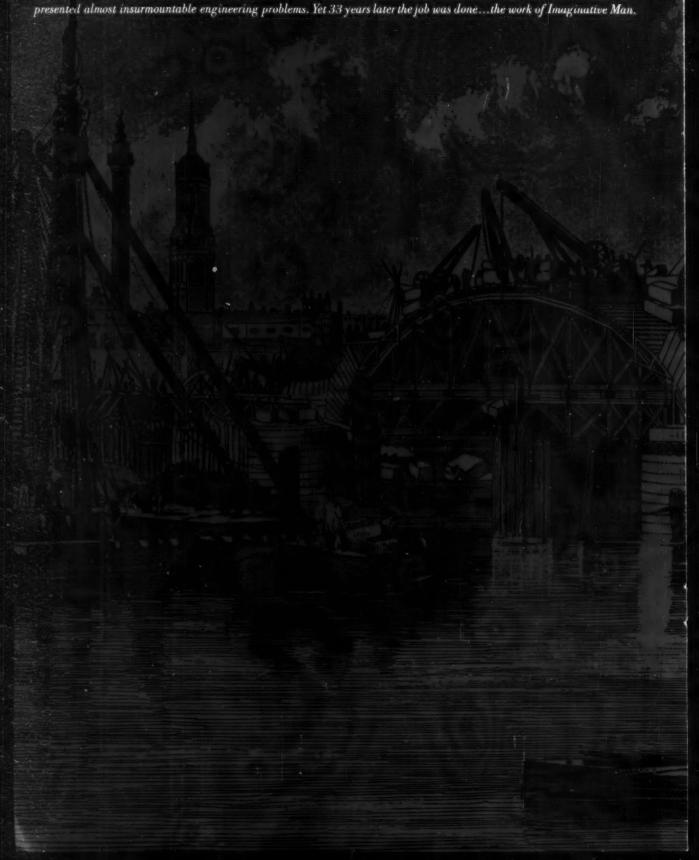


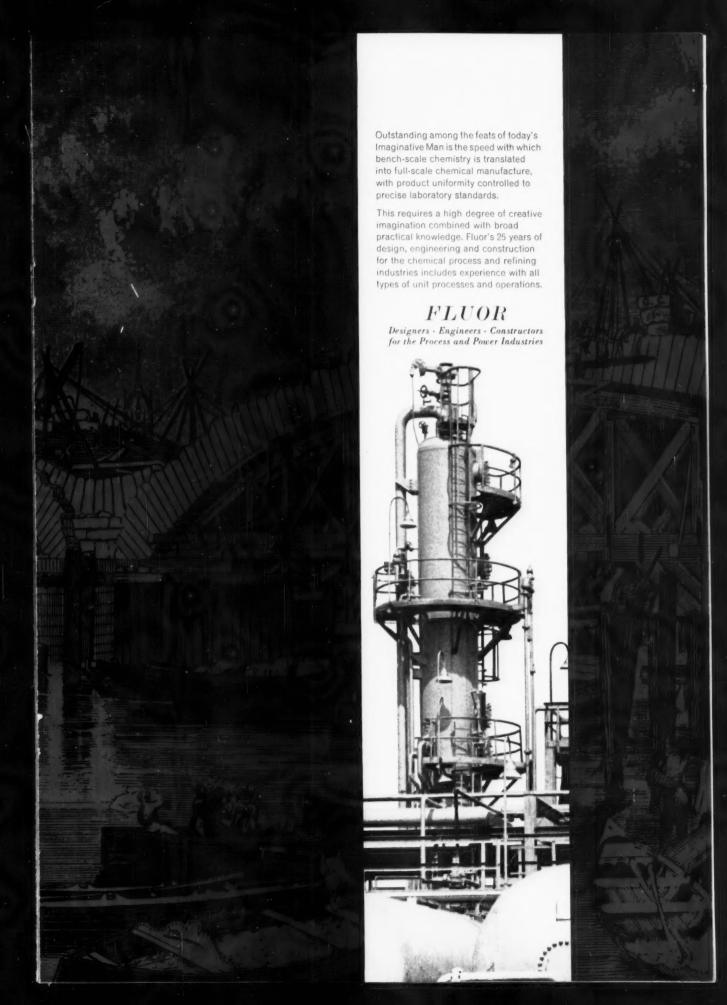
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Salesman supported by a sound company research program gets preference from purchasing agent.

# Research Carries Sales in Buyers' Market

Everything else being equal—and it frequently is—the sale of a chemical product can depend on the quality and quantity of the vendor's research. This not-so-self-evident observation was the principal behind-the-scenes conversation-sparker at the recent annual conference of the National Assn. of Purchasing Agents, in Chicago.

And a CHEMICAL WEEK survey of purchasing agents confirms that supplier's research is enjoying new significance in shaping buying decisions.

The reasons for this are enmeshed in the current market picture, which often finds few differences among vendors on price, quality, delivery, etc. Looking beyond these traditional criteria, purchasing agents lean to the supplier backed by the best research.

In the PA's eyes, a solid research program implies the guarantee of a flow of new products, assistance in finding new or improved raw materials, satisfactory technical service and an effort by a supplier to whittle away at his manufacturing costs. In addition, there's the assurance that part of the supplier's profits are going into work that may prove mutually profitable—a sort of investment by the buyer.

Sizing Up Research: Research departments that are aggressive, air their accomplishments as soon as feasible (through the proper sales channels), meet with the approval of purchasing agents like Henry Schoder, of General Mills' Chemical Division (Kankakee, Ill.). In appraising a supplier's research, Schoder likes to see whether the supplier's research staff is large and capable, old or young. ("Younger chaps are more adventuresome, more likely to come up with new ideas, products.")

He looks at the quality of technical literature ("the tighter the product specifications the better") and the reputation the supplier has for research in a given field.

His evaluation, Schoder admits, is strictly informal. "It's hard to rate big companies, like Du Pont and Union Carbide, first, second, or third

### RESEARCH



Morton Chemical's Perlman gets a line on supplier's research from publications.



General Mills' Schoder believes young research staffs are more likely to succeed...



IMC's Teeple declares that research is 'undersold' by most sales forces.

on research and I wouldn't presume to," he says. Rather, ratings such as "good," "average," or "poor" are more realistic. New sources for a specific item must show a research rating comparable to that of the first supplier, Schoder warns.

Glenn Reinier, director of purchases, Abbott Laboratories (North Chicago, Ill.), especially values a supplier's new-product research and leans toward firms that encourage outside development of new products (e.g., by potential purchasers). Some big companies don't do this, make it hard for the purchaser to get a competitive advantage, he says. Reason: "You don't get warning or time to work samples into your own experiments . . . to come up with something before everyone else does." Supplier research to reduce manufacturing costs also rates high with Reinier

Willingness of a supplier to ship samples of new products without charge is frequently looked on with favor by PAs as proof that the former's research department is proud of its accomplishments, has concrete evidence of its work.

Research is also important to the PA as an indication of what he can expect in services. Morton Chemical Co.'s (Chicago) purchasing director, Lester Perlman, thinks a solid research program is evidence that the supplier has a good background in how to handle, store, package, ship and label its products.

Perlman evaluates research informally, but has developed some guides. He makes a mental note of how fast and how well technical service people come up with answers, also pays attention to the quality of technical literature. (Item: most purchasing agents believe good technical service is rooted in good research.) But this is secondary to the impressions he gleans from correspondence. A supplier's letter containing information on a technical problem must be factual, concise and easy to read-or Perlman draws a poor impression of the supplier's researchers as well as the supplier.

He also gets a line on research strength from new-product items in business magazines, feels these are more important than patents, size of staff, new labs, etc., in assessing a research effort.

Perlman states that supplier research plays a definite role in how Morton awards its business. It can be "all important" in special cases, or "just one of many factors" in the case of fairly standard products.

That's the attitude, too, of Chester Teeple, director-purchases, International Minerals & Chemical Corp. (Chicago). "Our interest in a supplier's research will vary," says Teeple. "We can't get greatly interested in a supplier's plastics research, when all we buy from the firm is sulfuric acid. But when it comes to flotation chemicals, for instance, we are very interested, particularly in the research's profit-making potential for us."

Selling Research: Teeple thinks that research is undersold by most sales forces, backs this contention with a recent IMC survey. IMC wrote to 27 major suppliers of chemicals, oils and paper to find out what services these firms offered. Object: to compare these with IMC services to determine where IMC could profitably make improvements. All 27 suppliers mentioned technical service but only four noted research—clear proof, says Teeple, that research is undersold.

One purchasing veteran who doesn't agree with this surmise is Vernon Carstens, director of purchases for Nalco Chemical Co. (Chicago). His department regularly spends upwards of 60% of Nalco's sales dollars for goods and services. Because Nalco is a specialty chemical maker, his department buys many different products. Carstens concedes that research is undersold only where there is lack of liaison between the vendor's research and sales departments—an uncommon occurrence, in his opinion.

Tour the Labs: To get a really good idea of a supplier's research\* Carsten recommends visiting labs and plants. He personally makes such visits. But Nalco technical personnel make many more, relay their impressions of the vendor's technical proficiency, equipment, etc., along to Carstens. Some purchasing agents take their own research people along on such visits.

Plant visits are important to Morton's Perlman, too. He prefers to

\*The Defense Dept. has an elaborate method, employing checklists, to evaluate supplier research.



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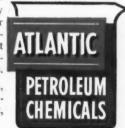
Atlantic Ultrawets are superior alkyl aryl sulfonates which work wonders in cotton scouring, wool scouring, soaping off and dye leveling. With proper use, Ultrawets solve such problems as hard water precipitates, stubborn stains and streaking. Ultrawets are produced in liquid or solid form with a full range of molecular weights to meet

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### RESEARCH

get Morton researchers together with the supplier's research team. He forms his own impressions, augments them with those of the Morton staffers. "Criteria are hard to develop," Perlman says, "but, somehow, firms with strong research in areas of interest to you manage to stand out." One indication: how often the host suggests questions that the purchasing agent neglects to ask.

How much influence does a supplier's research have on a purchasing agent's buying decision? The amount, of course, will vary. But one thing is sure: PAs are primarily swayed by applications work that promises mutual profits-preferably soon.

# Insecticide Gains

Insects are helping insecticide researchers achieve a speedup in two important areas: (1) field-testing of residues; (2) combating specific insect pests.

The residue work is being done by Robert Harwood, research entomologist at Washington State University (Pullman), under a recent \$25,000 grant from the U.S. Public Health Service.

Harwood is now studying a bioassay test in which a group of "standard" insects (e.g., fruit flies) are exposed to extracted residue. The type and amount of insecticide used reportedly can be determined from the reaction of the test insects.

Because it can be used to categorize an unknown insecticide, the test can be a big timesaver in insecticide identification. But Harwood doubts that it will ever offer absolute proof of identity; chemical analysis will still be needed.

The method is now applicable to highly purified insecticides, must be refined further for field work.

Test insects are providing the answer to a problem in the search for an effective agent to be used against a destructive species known as the plum curculio. Researchers at Cornell University's New York State Experiment Station (Geneva, N.Y.) have worked out conditions for keeping this species alive in the laboratory.

The tests that had previously took years because of the limited natural availability of this insect can now reportedly be finished in weeks.

# **Product Suggestion Box**

A top-management committee is the crux of a new idea-producing system in force at Vitro Chemical Co. (New York).

Employees are invited to turn in suggestions for a new product or product lines on a special form, which is sent directly to the committee.

Vitro's objective is to tap both research and nonresearch personnel for new ideas and to centralize the new-product aims of the three companies (Heavy Minerals, Vitro Rare Metals and Vitro Uranium) from which Vitro Chemical was formed last October.

The committee serves as an advisory group to Research Director Paul Kruesi. It is composed of President William Hall (vice-president of parent Vitro Corp. of America), heads of sales, production and market research, and representatives of Vitro Laboratories and Vitro Inter-

At a recent meeting of the committee in New York City, 16 potentially commercial ideas were examined. How many of these will blossom into research projects still isn't certain, but the firm is encouraged by initial results of the plan.

### EXPANSION

- · Sulphur Institute is a new international research organization with headquarters in Washington, D.C., and a European office in London. Its purpose is to expand the use of sulfur in agriculture and industry through research and education programs.
- · Ontario's provincial government will build a \$220,000 radioactivefallout research laboratory in Toronto.
- · United Carbon Co. will start construction of a \$2.5-million suburban office and research center near Addicks (west of Houston), Tex.
- The Electric Auto-Lite Co. (Toledo, O.) is bringing its chemical and metallurgical laboratories into its central research organization. Current projects include work in nuclear ceramics with the Atomic Energy Commission and military applications of new plastic and plastic-ceramic combinations.
  - Shawinigan Resins Corp.



# Emery digs in

# to expand Pelargonic, Azelaic Acid supplies

Emery's recently announced expansion of ozone oxidation facilities will increase several fold total production capacity of pelargonic and azelaic acids.

The volume requirements for these materials in such important products as synthetic jet lubricants and top-quality plasticizers for vinyls have been spiralling upward as customer research programs have progressed to successful commercial status. And, extensive research in other areas, such as alkyd resins and polymers, promises to broaden the existing demand even further in years to come.

This 6 million-dollar capital investment offers every encouragement to such application research. So with this additional supply close at hand, we suggest you investigate pelargonic acid (C9 monobasic) and azelaic acid (C9 dibasic) to see how they can fit into your development programs. Write now for samples and literature on these two products, Dept. I-3.



# **Organic Chemical Sales Department**

Emery Industries, Inc., Carew Tower, Cincinnati 2, Ohio Vopcolene Division, Los Angeles • Emery Industries (Canada)Ltd., London, Ont. • Export Department, Cincinnati How United States Testing Company helps

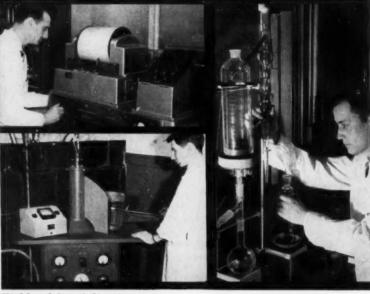
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### RESEARCH

(Springfield, Mass.) will organize a new research group for "exploratory research in the synthesis of totally new plastic resins."

• Sylvania Electric Products Inc., subsidiary of General Telephone & Electronics Corp., will build a new electron-tube research and development center near Emporium, Pa. A portion of the new center will consolidate the chemical research labs of the Sylvania Electronic Tubes Di-

· Motor Products Corp.'s (Detroit, Mich.) subsidiary Trionics Corp. is entering "custom" preparation of rare earths and other high-purity materials for electronics research.

· Dow Chemical has renamed its Electrochemical Research Laboratory. now calls it the Electrochemical and Inorganic Chemical Research Laboratory. The Spectroscopy Research Laboratory will be called the Chemical Physics Research Laboratory.

### PRODUCTS

Fermentation Entry: Car-load quantities of dihydroxyacetone are now available from The Wallerstein Co. (Staten Island, N.Y.), a division of Baxter Laboratories, Inc. A fermentation product of glycerine, the compound formerly sold for up to \$1,000/lb. in research quantities. But a new process allows a price slash to \$8.70/lb. Suggested applications: in food emulsifiers, plasticizers, fungicides, alkyd-type resins and pharmaceuticals.

Bio Find: Crystalline xanthopterin is now offered by Mann Research Laboratories, Inc. (New York), for biochemical, nutritional and cancer research. Price: \$38/gram.

Fatty Acids: Applied Science Laboratories, Inc. (State College, Pa.), is expanding its line of high-purity fatty acids, now offers methyl palmitoleate, methyl arachidate, methyl behenate, and saturated odd-carbon methyl esters (C9-C21) in quantities suitable for chromatographic standards.

Isotopes: The Isotopes Specialties Co. (Burbank, Calif.), division of Nuclear Corp. of America, offers two new labeled compounds: allyl alcohol-1-C14 and allyl bromide-1,3-C14. They're useful in petroleum research.



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# **Chemicals from Armour improve polyurethane**

# Polyurethane Foam Catalysts

Requirements for catalysts of polyester and polyether urethane foams are widely diversified, depending on the desired results. In working with catalysts for polyurethane, Armour developed two chemical types of tertiary amine catalysts: alkyl dimethyl amines; N-coco morpholine. Both types exhibit strong base strengths and unhindered catalytic activity.

# Armeen® Dimethyl Amines

Armour's Alkyl Dimethyl Amines are foam catalysts of superior capabilities. They improve foam cell structure, impart better physical characteristics and reduce processing time.

These Armeens lower foam shrinkage and increase load-bearing capacities. They are extremely economical since they are effective in concentrations of 1 part catalyst per 100 parts resin.

Armeen catalysts are easily dispersed into "one-shot" systems or "pre-polymer" systems by proper machine-head agitation. Because of their lower volatility the Armeens also reduce chemical loss due to evaporation. Low vapor pressures impart negligible odor levels during handling and manufacture of ure-thane foams; cured foams are found to be virtually odor free.

### Physical and chemical properties of the Armeen Dimethyl Amines

	Amine Min.%	W	Mol. t. Max.	Color Gardner Max.	Volatile % Max.	Approx. Freeze Point
Armeen DMCD dimethyl coco	92	228	248	2	1	—15°€
Armeen DM16D dimethyl hexadecyl	92	269	292	2	1	10°C
Armeen DMSD dimethyl soya	92	292	318	2	1	— 8°C
Armeen DM18D dimethyl octadecyl	92	297	323	2	1	20°C

N-coco morpholine for improved "clickability"

Manufacturers and users of polyurethane foam now can produce a foam product with superior clickability. Clickability is the desirable characteristic that allows a foam to be easily cut or machined into its desired final shape.

Armour's N-coco morpholine permits polyurethane to be die-cut, stamped, sewn, or otherwise machined without any difficulty. All manufacturers of flexible polyester slab stock will find this versatile catalyst an essential addition to their foam-making formulations.

### Physical and chemical properties of N-coco morpholine

Tertiary Amine Min. %	Mol. Min.		Color Gardner Max.	Volatile % Max.	Primary and Secondary Amine-Max
88	264	280	13	1	2%

Improved clickability is only one of many advantages that n-coco morpholine enjoys over other catalysts for making polyurethane foam.

N-coco morpholine is a moderately slow catalyst that will afford uniform cell structure, reduce "tack-free" time, and generally improve the physical properties of polyester foam.

This Armour chemical is a convenient catalyst to use. It is in a liquid state at room temperatures and is easily dispersed into "one-shot" water systems.

Foams using N-coco morpholine show marked reduction in shrinkage and have increased load-bearing capacities. In addition, this catalyst has a pleasant, very faint lemon odor that will mask disagreeable odors of low molecular weight morpholine catalysts.



# and latex foams

### Latex Gel-sensitizers

Because of their unique gel-sensitizing properties, Armour's quaternary ammonium compounds cut processing time and costs for makers of latex foam.

Latex manufacturers use gel-sensitizers to control the gelation process. However, the action of ordinary sensitizers depends upon the formation of a complex to reduce the chemical stability of the latex and allow a firm gel to form.

Arquad® T-50 offers substantial improvement over sensitizers which depend on the formation of a complex. Therefore, this Armour sensitizer can be added to the latex prior to foaming. This processing advantage allows the manufacturer to make larger batches of foam, because the Arquad does not begin to work until other ingredients, such as zinc oxide, are added.

Armour's Arquad 12-50 also demonstrates improved advantages over ordinary gel-sensitizers. In particular, where low-density foams are required, as in pillows, almost 100% natural rubber must be used. Finished products of this nature must be free from odor, light in color and of uniform cell size. Arquad 12-50 imparts all of these characteristics.

Both Arquad T-50 and 12-50 have common advantages that have contributed to their popularity among latex foam makers. Three important advantages are: Controlled Gelation—By using a fixed amount of sodium silicofluoride, the rate of gelation can be controlled by varying the amount of Arquad used. Thus the time of gelation can be governed to suit the process. Increased Gel Strength—Cationic properties of the

Increased Gel Strength—Cationic properties of the Arquads reduce the charge on the rubber particle and render the latex more susceptible to the gelling action of the acids. This susceptibility makes a better, stronger gelation.

Versatility of Use—Both Arquads allow manufacturers to use a wide range of ratios of synthetic to natural rubber. Therefore giving you a greater latitude in formulation.

For additional information on Armour's foam catalysts and gel-sensitizers, and to receive samples of them, fill out and mail the convenient coupon.

# NEW DEVELOPMENTS FROM ARMOUR

# **Dust-Free Vinyl**

Thermoplastic manufacturers, who have been searching for a truly effective antistatic agent, will be pleased to learn about this latest Armour development.

Armour's ethoxylated quaternary ammonium chlorides offer a new, economical solution to the problem of electrostatic build-up in vinyl products. Polyvinyl and polyethylene products can be made permanently anti-static by incorporating Armour's Ethoquad® C/12 into your formulation. Ethoquad C/12 eliminates electrostatic build-up during manufacture, and also assures finished products an attractive, clean appearance.

Armour Ethoquads work more effectively because there are two separate mechanisms in the Ethoquad molecule that can reduce electrostatic build-up. These mechanisms, working independently, offer better protection than most other anti-static agents which have only the protection of a single mechanism.

To find out how this Armour chemical can be incorporated into your vinyl products, use the convenient coupon.



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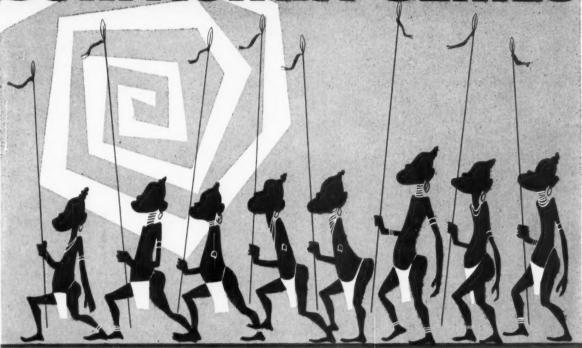


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SPECIALTIES



Chemicals got top billing on Broadway with the recent opening of Mike Todd, Jr.'s new movie "Scent of Mystery," filmed in "glorious Smell-O-Vision." The second scent-accompanied film, it followed "Behind the Great Wall" in AromaRama, which made a December debut in New York.

The advent of odor-bearing movies

is providing another new — and unusual — field for fragrance producers who, until a few years ago, didn't regard show business as a likely market for their wares.

How They Work: The Smell-O-Vision process uses compressed air to send the smells to each seat in the theater. On the 70-mm. film, a smell track, similar to the sound track, ac-

tivates a relay that triggers the smell-dispensing machine. The machine, made by Belock Instrument Co. (New York), holds a turntable containing thirty 8-in.-high vials—one for each scent.

Nine seconds before the odor is to be released, a hypodermic needle is plunged into the vial, picking up 2 cc. of solution. Then, a high-velocity fan



CW PHOTO-JOHN YAKATA

blows the scent through pipes, which have openings at each seat, the scent reaching each person in the audience simultaneously. Each fragrance-containing vial is said to last for several months. No provision need be made to remove the odor, according to Todd Productions, because it dissipates in the air shortly after expulsion. The cost of installing Smell-O-

Vision is said to be about \$30,000, with Todd bearing the expense. So far, only three theaters are equipped for the process.

In New York's Warner Theatre, the smell machine is located in a booth in the center of the orchestra. It could also be placed in the basement of a theater, says a Todd representative.

Second with Scent: Walter Reade, Jr.'s "Behind the Great Wall" beat Todd Productions to a public viewing by a few weeks. First shown Dec. 2, the film is a technicolor documentary of Red China, has already won prizes—minus odors—at the Venice Film Festival and the Brussels Exposition.

AromaRama, developed by Charles Weiss, for Reade's Continental Distributing, Inc. (New York), a film sales firm, uses aerosols to send odors through the air-conditioning system.

Here, too, a scent track on the film triggers the odor-producing machine, developed by Industrial Timer Corp. (Newark, N.J.). The fragrance, in 12-oz. aerosol cans, is wafted through the air-conditioning vents and is said to reach each spectator within two seconds. When the scene changes, the scented air is withdrawn from the theater through the air vents, purified, freed of odor and then returned to the theater.

AromaRama is said to be considerably less expensive to install than Smell-O-Vision. The main requirement is that a theater have a good airconditioning system. AromaRama installs the equipment, charging the theater owner a weekly rental fee. "Behind the Great Wall" plays continuously, with most theaters giving about 25 performances a week. The aerosol containers — using Du Pont's Freon propellent — are changed about once every 20 performances.

Cinematic Chemicals: Most of the odors called for by the "smellofilms" are scents that aromatic chemists had never before used commercially — e.g., fireworks and shoe polish.

About half of the 30 odors in "Scent of Mystery" were created by Alpine Aromatics, Inc. (Metuchen, N.J.). Among them are the aromas of pipe tobacco, fresh bread, a heavy oriental incense, train smoke and a fresh peach.

Raoul Pantaleoni, president of Alpine and Todd, Jr.'s consultant on smells, says he spent several months developing the tobacco odor alone. There are 35 different chemicals in the baking-bread smell and over 60 ingredients in the "Scent of Mystery" perfume (worn by the mysterious woman in the film).

Other scents include those of wood shavings, cement dust, roses, steaming espresso coffee, peppermint and lemon. Among the companies helping supply these odors were Felton Chemical Co., Inc., Rene Forster Co., Givaudan Delawanna, Inc., Magnus, Mabee & Reynard, S. B. Penick & Co. (all in New York) and Verona Chemical Co. (Newark, N.J.).

All 23 odors in "Behind the Great Wall" were developed by Rhodia Inc. (New York). Each contains from 10 to 20 chemical ingredients and, ac-

cording to Rhodia, each solution is highly concentrated.

Among the odors: Hong Kong streets, harbors and docks, incense, meadows, a tiger, evergreens, tea, fireworks, a Chinese restaurant and warm mud.

Rhodia says that in creating these smells its main problems were to make them realistic, and to come up with formulations that were compatible with the aerosol propellent and would evaporate quickly.

Future of 'Smellodrama': Whether scented movies will continue to be a market for aromatic chemicals is anybody's guess. Todd, Jr.'s picture has opened only in Chicago, Los Angeles and New York. "Behind the Great Wall" is playing in the same cities with plans to open in 48 additional towns within the next six months.

Todd Productions has no further Smell-O-Vision picture planned now. It is waiting to see how "Scent of Mystery" is received. Reade, however, has already scheduled "Scent of New-Mown Hay." Filming will begin soon in Europe and Hollywood. No other film company is known to be entering the smell competition at this time.

Six Years' Planning: "Scent of Mystery," described as a comedy thriller in which the odors are essential to solving the mystery, was conceived in '54 when Mike Todd, Sr., and his son first came across a smell process developed by Swiss inventor Hans Laube. In '56, Todd, Sr., toyed with the idea of adding smell to the movie "Around the World in 80 Days," but abandoned the notion because he thought the picture was spectacular enough without odor effects.

The idea of scented movies, however, isn't new. As far back as the silent-film era, the scent of orange blossoms was sometimes sprayed on audiences during wedding scenes. And more recently some Broadway stage productions have been odorized.

It was not until a few years ago, however, that two theatrical producers, the late Mike Todd, Sr., and Walter Reade, Jr., independently decided to develop a commercial system of dispersing odors as an integral part of films.

Many critics believe the "smellofilms" will never be anything more than a gimmick — but the public will cast the deciding vote.

# PRODUCTS

Thirty-Year Sealer: A calking compound claimed to have a "life expectancy" of over 30 years is available from Farboil Co. (Baltimore 30, Md.). Farboil Epothane Farbo-Flex is suggested for building, highway construction, marine installations, air conditioning, aircraft, oil fields, and refrigeration. The compound is said to remain flexible permanently on exterior or interior, can withstand extreme continuous expansion and contraction at temperatures from —65 F to 300 F, and is not affected by chemical fumes.

Fiber Antistatic: A new antistatic agent for use on nylon, acetate, Dacron, Orlon among other fibers is being marketed by Crest Chemical Corp. (225 Emmet St., Newark, N.J.). Crestex Antistat B reportedly promotes resistance to lint and dust and reduction of electric shocks and garment clinging.

A viscous liquid soluble in cold water, it is compatible with nearly all types of finishes, including resins, softeners and fixatives.

Rug Shampoo: A synthetic-liquid rug shampoo, formulated for "on location" cleaning of carpets and upholstery, is being marketed by J. I. Holcomb Mfg. Co., Inc. (Indianapolis, Ind.). Holcomb Rug Shampoo is said to clean wool, cotton and synthetic carpets without causing fading. It contains an agent to prevent mildew, and does not separate when stored. It's available in 5-gal. containers.

Paint Thickener: Nopco Chemical Co. (60 Park Place, Newark, N.J.) now sells its Metasap Thickener A for use as a bodying agent in interior and exterior paints. The product is claimed to assist pigment suspension, improve brushability, prevent orange peel and inhibit penetration into surface pores. Price: 59¢/lb. (ton-loads).

Waterproof Glue: Woodhill Chemical Co. (1390 East 34th St., Cleveland) has brought out Duro-Plastic White Glue for home or craft use. The adhesive is claimed to adhere to wood, metal, leather, china, rubber, paper and cloth, is reportedly not affected by oil, water or gasoline. A 4-oz. tube sells for 69¢.

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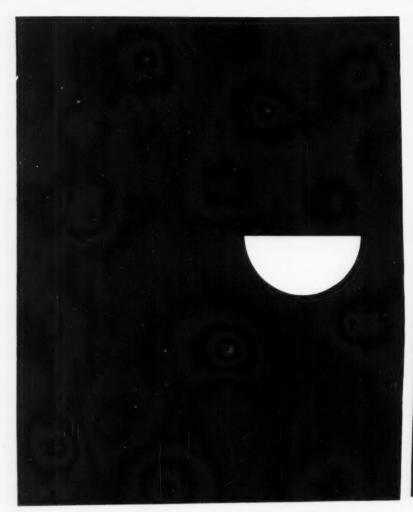
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# **Technology**

# Newsletter

CHEMICAL WEEK March 5, 1960 Look for stepped-up activity in chemicals derived from wood.

Recent research and development studies at Forest Products Laboratory (Madison, Wis.) indicate that furfural, hydroxymethylfurfural and levulinic acid are hot prospects for commercial wood-chemical processing. FPL predicts that the wood-sugar route will win out over current methods based on corn cob processing. Plans for pilot-plant production of furfural from xylose are now in the works.

As for levulinic acid, the present research goal is a production cost of 5 e/lb. FPL predicts, however, that a price of even 10-15 e/lb. would create a boom in levulinic usage.

Live measles virus vaccine looks promising in clinical trials on children. Dr. Samuel Katz of the Harvard Medical School and John Enders, also of Harvard, report that the vaccine was injected into 79 children; 77 now appear immune to measles, based on antibody-response studies.

As little as 10 parts per billion of hydrocarbons in air can be detected by a new instrument developed at American Cyanamid's Stamford, Conn., research laboratories. Inexpensive (expected to sell for less than \$500) and portable, it's for monitoring smog-formers in auto exhaust, may also prove useful in oil exploration, gas leak detection and explosive vapor detection. Cyanamid's device, rights to which will be made public, is based on formation of ionized particles when hydrocarbons are burned. The amount of electricity conducted by the ionized particles when a voltage is applied indicates the concentration of hydrocarbons in the exhaust.

Sea-water conversion by secondary refrigeration is being stepped up to pilot-plant scale by the Interior Dept.'s Office of Saline Water. The agency has awarded Blaw-Knox a \$141,430 contract for the construction of a 35,000-gal./day, direct-freezing plant, employing the method developed by Cornell University professor H. F. Weigandt.

Carrier Corp. (Syracuse, N. Y.) has been piloting another direct-freezing conversion process for about a year (CW, Jan. 17, '59, p. 39). Chief difference in freezing methods: Carrier uses flash evaporation of water vapor for freezing; Weigandt's method involves flash evaporation of a secondary refrigerant (immiscible hydrocarbons such as propane, butane or isobutane). In a recent estimate of water conversion costs, OSW research chief W. Sherman Gillam predicted that direct freezing plants could attain the \$1/1,000-gal. range this year.

Success with using a new cancer drug is reported by Sloan-Kettering Institute (New York). The drug, epoxypropidine, was synthe-

# **Technology**

# Newsletter

(Continued)

sized by Eli Lilly's (Indianapolis, Ind.) Koert Gerzon. Twelve of 21 cancer patients using it show "significant clinical improvement," a test record that the institute researchers say indicates efficacy about equal to that of nitrogen mustard; epoxypropidine's plus is that it has fewer side effects.

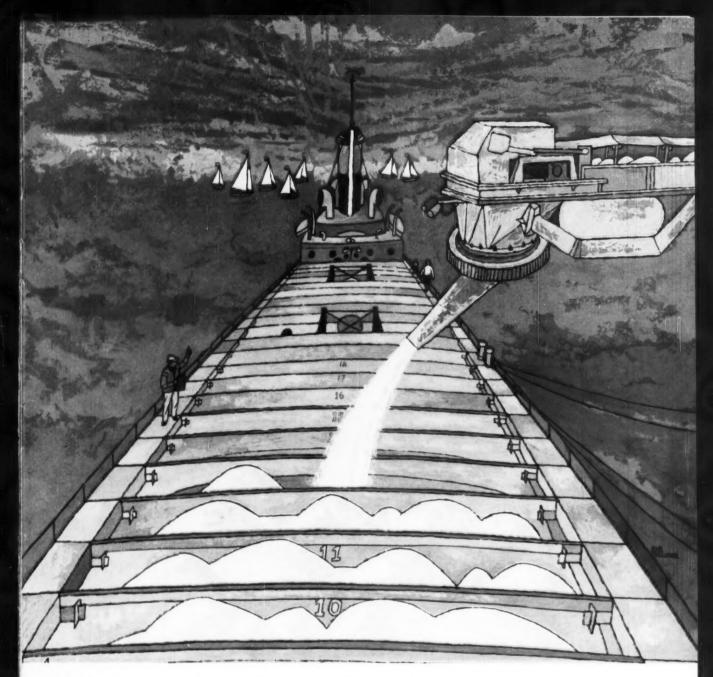
Direct conversion of nuclear energy into high-voltage electricity is claimed for a new device developed by Soviet scientists. The system is powered by heat from a beta radiation source, reportedly develops 24 kilovolts. Operating details, size and weight of the new generator haven't been disclosed, but it's described as a small bulb made by welding two glass cylinders around a metal ring. Inside the ring is a seamless, aluminumlined nickel tube containing the beta-emitting compound.

A model of another Russian thermoelectric generator which has been in production at least two years, is now being studied by The Martin Co. (Baltimore, Md.). It operates on heat from a kerosene lamp, weighs 20 lbs., costs about \$56 and was designed to power radios in remote Asian areas. Martin obtained the device in England, as part of a program to evaluate Russian technology in direct conversion. Martin's interest: it developed AEC's SNAP-111 generator (CW Technology Newsletter, Jan. 24, '59, p. 63).

Newest tranquilizer: Librium, released this week for prescription sale by Hoffmann-La Roche, Inc. (Nutley, N. J.). Chemically methamino-diazepoxide, the drug reportedly sets a new mark in safety and speed of action. Best results of H-L's concentrated test program—2,000 physicians tried it on 20,000 patients last year—were achieved with alcoholics. And in prison disciplinary problems in Texas, 16 of 19 patients showed improvement in cases where barbiturates and other tranquilizers failed.

First commercial production of Methyl Trithion started last week at Stauffer's recently integrated pesticides plant in Henderson, Nev. (CW, Sept. 5, '59, p. 37). The first of several proposed analogs of Trithion (o, o-diethyl S-p-chlorophenylthiomethylphosphorodithioate), the methyl-substituted compound is still under an experimental label. Stauffer expects to make limited commercial quantities available for boll weevil control before this year's cotton growing season. Another promising use soon to be evaluated: mosquito and gnat control in California's resort areas.

A new heat-resistant plastic resin was unveiled last week by Upjohn Co. (Kalamazoo, Mich.). It's poly-2,3-diphenylbutadiene, which is described as physically similar to polystyrene but much more stable at high temperatures. The newcomer can be milled at 300 F, says Upjohn, retains electrical insulating properties up to 265 F and exhibits good resistance to radiation effects.



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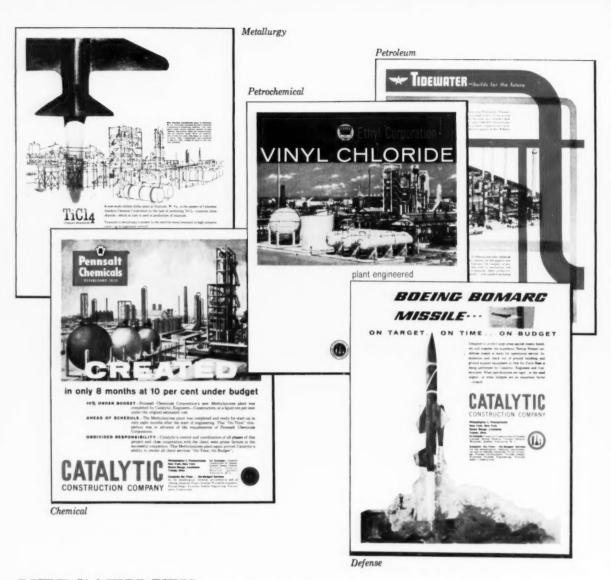
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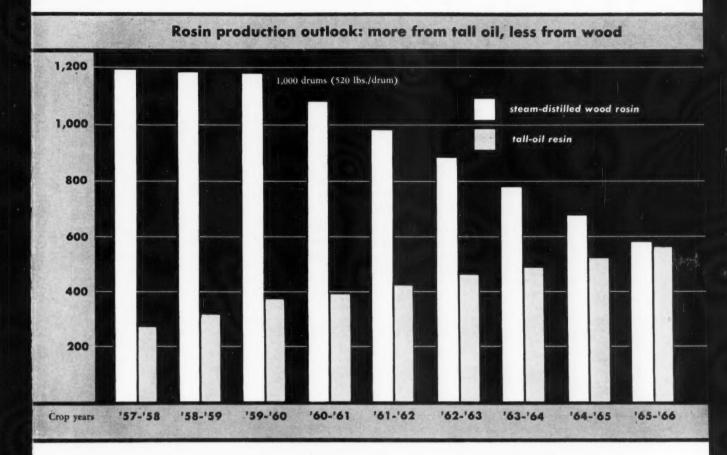
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# Source Switch Shakes Up Rosin Outlook

The U.S. rosin industry—plagued by dwindling supplies of gum rosin—now faces new troubles. During the next decade, wood rosin supplies will decline substantially, creating a supply problem that won't be solved by expected increases in production of gum and tall-oil rosins.

A recent survey of the situation by the U.S. Dept. of Agriculture points up these opposing trends: rosin output from steam-distilled wood (the major source now) will decline steadily to about half of current production by '65; meanwhile, tall-oil rosin production is expected to increase only moderately.

Tall-oil rosin output will not offset wood rosin losses. Even an expected increase in output of softwood sulfate pulp (averaging 6-7%/year in the next few years) and likely 10%/-

year boosts of tall-oil fractionating capacity aren't likely to brighten the supply picture significantly.

Third factor in the total rosin market is the steady decline of gum rosin supplies—output dropped from 531,620 drums in '53 to 350,000 drums in '59. But there's a chance that, as rosin supplies become tighter, because of the falling output of steam-distilled wood rosin, prices will rise and gum rosin output will be stepped up. But USDA doesn't pinpoint probable increases in gum rosin production, and it's doubtful that enough more will be made to close the supply gap created by shortages of wood rosin.

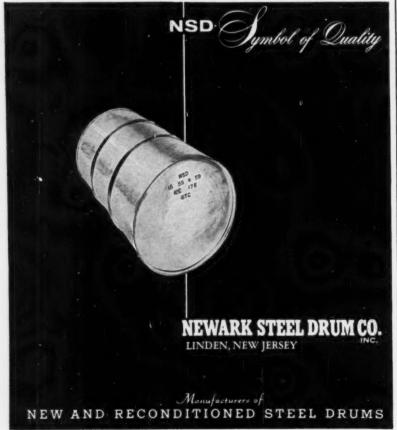
H. L. Meyer of Chematar Pine Products forecasts the current season's gum rosin output at about 350,000 drums, wood rosin at 1,175,000 drums, tall-oil rosin about 365,000 drums a total of some 1.89 million drums, less than a 2% gain over the previous year.

CCC Stocks Peter Out: Domestic consumption was considerably more than output; reserve stocks of the Commodity Credit Corporation saved the industry from a severe shortage (about 500,000 drums of rosin were sold by CCC).

In the coming season, gum rosin output will increase slightly, if at all—perhaps about 25,000 drums, according to Meyer. A probable output of 390,000 drums in the 1961-62 season is expected.

Such a moderate increase in rosin output, plus depletion of CCC stocks, adds up to only one thing: a severe pinch. Likely upshot: exports will be shaved substantially—a prospect that





### MARKETS

doesn't gladden rosin exporters. The pinch, therefore, would become world-

Controls Amendments? If the pinch becomes tight enough, there's the possibility that some rosin marketers will again-as they did a few years ago-try to push amendment of government controls, which now forbid mixing rosins from different sources prior to sale. Rosin sellers have long argued that if mixing were allowed, some of the industry's marketing problems could be eliminated.

The Naval Stores Division of the U.S. Dept. of Agriculture queried rosin producers about this proposal: but there was so little general interest that further moves toward amendment of the control act were abandoned by the government agency.

In any case, the attitude of Naval Stores now is not encouraging to those who might attempt to push through an amendment. Reasons for the restriction, explains a Naval Stores spokesman, center on the difficulty of determining the content of rosin mixtures; it's a handicap that prevents many buyers from knowing just what rosin blends they might be getting. Such information is vital to users, since rosins from various sources differ significantly in composition (some revert to undesirable crystalline forms more readily than do others).

Chemical Uses Grow: In the '58-'59 crop year, according to government statistics, chemical uses for rosin took 461,856 drums (520 lbs. net)-more than the 442,518 needed in the preceding year.

But government statistics must be considered with care because they can be misleading. For example, consumption of rosin for manufacture of adhesives appears to have declinedfrom 18,059 drums in '57 to 14,725 in '58. Use of straight rosin did decline, but this was offset by an increase in demand for modified rosins listed in the "chemicals" category (this also partly accounts for demand growth for chemical uses).

A similar situation occurs in the use of rosin for manufacture of paint, varnish and lacquer; rosin consumption declined from 506,817 drums in '57 to 541,266 drums in '58. However, an additional hidden volume of rosin went into paints in the form of ester gum and synthetic resins (a category that increased from 217,746 drums in

# See why ALCOA ALUMINUM makes a good design habit

**Requirement:** A low-cost material able to stand up at temperatures below  $-190^{\circ}$ F

**Key to good design:** Specify Alcoa Aluminum for piping and equipment in the cryogenic range

When process temperatures reach levels below 0°F, aluminum becomes easily the most satisfactory metal for process equipment and piping. Many materials undergo pronounced changes in physical structure at these temperatures. In most cases, the result is substantial deterioration in the material's serviceability. The reverse is true with aluminum, however.

Aluminum alloys actually display significant improvement in major mechanical properties as operating temperatures drop past 0°F to -300°F and below. For instance, tensile, shear and fatigue strengths of aluminum alloys increase with a decline in temperature.

Operating experience in actual applications has proved

the stamina of aluminum in such varied cryogenic applications as these: tonnage oxygen production . . . low temperature recovery of hydrogen from refinery gases . . . methane liquid action, storage and transportation . . . air enrichment for steelmaking. You will find a number of aluminum uses in these and other applications described on the following pages.

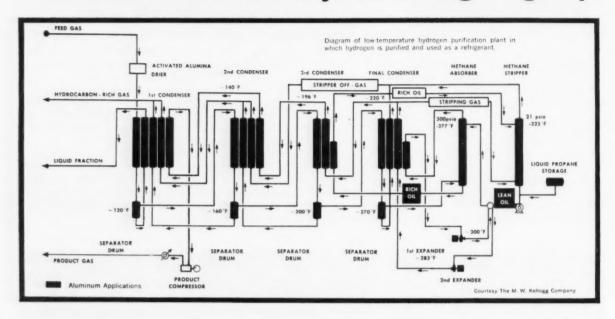
One other fact deserves major consideration in evaluating the cryogenic applications of aluminum. It is the surprisingly low initial cost of the light metal. In most instances, aluminum has proved to be far and away the most economical material able to serve satisfactorily in a wide variety of cryogenic operations.



March 5, 1980 . Chemical Week



# Aluminum's tensile and yield strengths go up





Because aluminum shows no embrittlement at low temperatures, it enjoys wide use in hydrogen purification plants such as the one shown above.

Aluminum has proved extremely effective for transport piping and tankage in the handling and storage of liquid methane. It is also being used in insulated cargo tanks aboard ship for overseas transport of liquid methane.

Photo courtesy Constock International Methane, Ltd.

This low pressure air separation tower is typical of aluminum equipment now finding broad use in cryogenic operations in the petrochemical field.

Photo courtesy Project Fabrication Corp.



# See why ALCOA ALUMINUM makes a good design habit

# as the temperature goes down



The light weight of aluminum, added to its low temperature performance, makes for easy, effective handling and storage of liquid nitrogen in this 600-liter container fabricated of Alcoa Aluminum Alloy 5154.

In the chart below, you see results of tensile tests on various aluminum alloys at temperatures ranging from 75°F to -423°F. Note that at -423°F tensile strengths average 35-50 per cent higher than at room temperature, yield strengths 15-25 per cent higher. Temperature drop also brings about increases in elongation. And you will notice that there is no undesirable loss in reduction-of-area.

Here, you see evidence of the outstanding low temperature mechanical properties which, coupled with low cost, make aluminum synonymous with efficient, economical design for cryogenic equipment.

Results of Tensile Tests of Some Aluminum Alloys at Subzero Temperatures

Temp.,	Alloy and Temper	Tensile Strength, psi	Yield Strength,* psi	Elong. in 40,	Red. of Area, %	Alley and Temper	Tensile Strength, psi	Yield Strength,*	Eleng. in 40,	Red. of Area, %	Alley and Temper	Tensile Strength, psi	Yield Strength,* psi	Elong. in 40, %	Red. of Area, %
75	3003-0	15,600	6,000	43.0	81	5154-0	35,200	17,100	28.8	66	5356-0	42,100	19,200	30.0	54
- 18		15,600	6,100	44.0	81		35,400	16,600	31.5	72		42,800	19,400	31.5	65
_112		19,000	7,300	45.0	80		36,500	17,200	35.0	73		43,300	19,700	33.5	66
-320		32,300	8,600	48.8	76		51,200	19,600	41.6	60		61,300	22,200	42.5	48
75	3003-H14	23,200	21,500	14.0	54	5154-H32	41,900	31,800	19.0	61	5356-H32	46,300	32,000	24.0	54
_ 18		24,000	21,900	15.0	58		43,000	31,900	22.0	68		46,600	32,100	24.0	62
-112		25,600	22,300	18.5	59		44,300	32,600	25.3	68		47,500	32,600	27.0	64
320		36,600	25,900	32.5	56		62,300	37,400	34.0	53		63,900	37,100	34.0	53
75	3003-H18	30,400	26,700	9.0	34	5154-H34	43,800	34,600	17.0	55	5356-H34	53,200	40,100	16.5	51
18		32,000	28,000	8.0	37		44,000	34,600	19.8	62		53,900	40,400	18.5	55
_112		33,400	29,300	11.0	44		45,300	35,400	20.5	64		55,100	41,200	21.0	58
_320		42,800	33,400	23.0	46		55,800	39,800	23.0	58		73,400	47.100	27.5	43
75	5052-0	29,100	14,300	33.2	72	5154-H38	50,400	42,100	14.2	45	5083-0	45,400	21,800	23.0	35
18		29,200	14,400	35.8	74		51,000	42,300	16.9	55		46,700	21,000	24.5	39
_112		30,600	14,300	40.8	76		52,200	43,800	19.8	56		47,000	21,200	27.0	47
_320		44,800	16,800	50.0	69		67,400	49,900	24.4	48		62,900	23,800	33.0	38
75	5052-H32	32,200	24,400	21.7	72	5086-0	36,600	16,000	32.0	55	5083-H113	49,800	40,800	15.5	29
_ 18		32,900	24,100	22.9	73		36,400	16,600	32.0	60		51,000	38,700	18.0	37
_112		34,800	24,300	26.3	74		37,100	15,600	36.0	62		52,100	42,200	19.0	40
_320		50,700	28,400	37.7	64		52,400	17,000	49.0	52		67,800	48,400	25.0	36
75	5052-H34	38,500	31,200	17.4	58	5086-H32	43,300	31,100	16.0	27	5456-0	50,800	24,100	20.0	26
-18		38,800	30,600	18.8	62		45,200	31,400	18.0	38		49,900	23,700	22.5	34
-112		40,700	31,800	21.0	60		46,900	32,200	23.0	45		49,700	24,000	25.5	41
_320		55,400	37,100	29.7	56		64,400	37,300	30.0	35		66,000	26,800	30.0	33
75	5052-H38	40,100	34,200	16.6	59	5454-H32	42,700	28,900	16.0	30	5456-H321	55,000	38,200	12.0	16
18		40,700	33,800	18.3	63		44,100	29,300	19.0	38		57,600	39,600	13.5	19
-112		42,400	34,300	20.6	64		45,500	30,300	22.5	44		57,500	39,200	17.0	27
_320		57,900	39,800	30.9	57		63,200	35,700	31.0	35		74,100	45,400	22.5	21
75											6061-T6	44,300	38,200	19.8	50
_ 18												46,100	38,700	19.0	50
112					1							48,100	40,200	20.0	50
_320												59,200	45,000	24.6	46

<sup>\*</sup> Offset = 0.2 per cent

The low temperature ductility of aluminum made it practical to construct this entire oxygen plant of aluminum. The harp-type heat exchangers at the left are dip-brazed assemblies which contain thousands of tiny fins for maximum heat transfer. The structural utility of aluminum may be inferred from the fact that the tower at the right extends some 100 ft.



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- 20935 Designing to Prevent Corrosion
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Name	
Company	
Title	
Address	
City	Zone
State	

### MARKETS

'57 to 218,542 drums in '58).

Increased demands were reported in the following industries (520-lb. drums): paper and paper size, from 506,817 in '57 to 541,266 in '58; printing ink, from 8,082 to 9,233; insecticide and disinfectants, from 1,149 to 1,195; other industries, from 10,058 to 10,730.

Consumption of rosin in some industries declined: foundries and foundry supplies, from 134 drums in '57 to 90 drums in '58; oils and greases, from 10,762 to 8,283; rubber, from 61,564 to 58,197; shoe polish and shoe materials, from 1,826 to 1,553; soap, from 14,407 to 11,950.

The paper category shows a definite increase because data reported doesn't involve confusing cross-reporting in other categories. Moreover, data for '57-'58 includes gum and wood rosin; and, in the '58-'59 tabulation, tall-oil rosin has been added to the total for the first time. In this sense, the two-year data aren't strictly comparable, should be considered only as rough guides to what is happening.

This means that apparent increase in total consumption from 1.352 million drums in '57 to 1.39 million in '58 could be misleading; inclusion of tall-oil rosin in the '57 data—or elimination from '58 data—might show a smaller use growth than is at first evident.

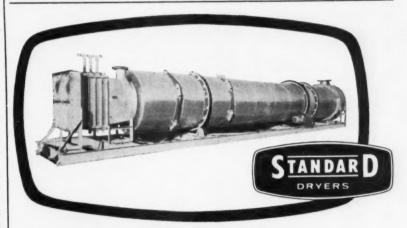
Latest naval stores market report (for Jan. '60) points up the fast-tight-ening supply situation; output of gum rosin in the first 10 months of the current crop year were down 11%, compared with output during the preceding season.

"Free stocks" of rosin (total available) amounted to 141,290 drums Jan. 31, 104,720 drums more than a year earlier; but this doesn't indicate a supply improvement, because stocks available Jan. 31 also represents the over-all stock of gum—408,010 drums less than last year, when 512,730 drums of CCC-held rosin were available (all of which has been sold).

Although output of tall-oil rosin increased in January, stocks of rosin from this source were 8,690 drums less than a year ago.

Even if consumption of rosin remains only more or less steady in the next few years, the industry apparently is headed for trouble because of declining supplies, and not all needs will be fully met.





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# **Behind Phthalic Hike**

Reichhold Chemicals last week tacked up "emergency" price hikes on two hard-to-get items — phthalic and maleic anhydrides. Cost of phthalic was pushed up  $2\phi/lb$ . to  $21\phi/lb$ . and maleic tabs were hiked  $10\phi/lb$ . to  $38\frac{1}{4}\phi/lb$ . in carloads.

Industry response: some said a general phthalic boost would come only if naphthalene prices go up; but Monsanto lost little time raising prices to  $18\frac{1}{2}$  \$\psi/1\text{b}\$. (tank cars),  $19\frac{1}{9}$  in carlots,  $20\frac{1}{9}$ /1b. 1.c.1.

RCI's previous price of 19¢/lb. on phthalic was itself a focus of controversy last year, when the firm posted tabs 2¢/lb. higher than those charged by other producers (CW Market Newsletter, June 27, '59). The new increase is described as a temporary expedient to keep phthalic moving in the face of high raw-material (naphthalene) costs.

How long will the higher price hold? It's hard to say, but probably at least through '60.

Meanwhile, RCI President Henry Reichhold predicts that a more realistic price—around 15¢/lb.—will come by '62. One reason: a likely cut of naphthalene prices, when petroleum producers come into the picture. (RCI will eventually get 50% of its naphthalene requirements from petroleum.)

Maleic Markup: RCI's big 10¢/lb. price increase on maleic anhydride is pinned to the need for installation of "emergency equipment" to keep maleic moving to customers in the current supply pinch; Reichhold believes such expense is justifiably written off as quickly as possible.

The firm is pushing hard to increase both phthalic and maleic capacities. Its new 30-million-lbs./year phthalic unit is now onstream at Elizabeth, N.J., will be in full production by mid-March. Capacity of its Azusa, Calif., plant is being doubled from 8 to 16 million lbs./year (completion is due in about a year). Another 60-million-lbs./year phthalic plant will be onstream at Newark, N.J., by the end of '61. The firm's new, 20-million-lbs./year maleic anhydride plant at Elizabeth will also be ready in late '61.

Meanwhile, President Reichhold has one answer for possible industry repercussions to higher prices and the future maleic overcapacity problems that may be expected if all declared expansion plans are completed: "It's all part of the fascinating chemical business." But he believes the outlook for the chemical industry—including phthalic and maleic makers—is still brighter than ever.

## MARKETPLACE

Soap and synthetic detergent sales hit a peak in '59, reports the Assn. of American Soap & Glycerine Producers. Total sales, about 4.27 billion lbs.—\$1.09 billion—were up 4.4% in volume, 5.1% in value.

Synthetic detergent sales hit 3.2 billion lbs., up 8.5% from '58; value increased 8.1%, to \$774.2 million. Solid syndets were up 4.6%, to 2.63 billion lbs., and value increased 3%, to \$571.3 million. Liquid syndets soared 31.4%, to 566.1 million lbs., and value 25.9%, to \$202.9 million.

Soap sales dropped to 1.06 billion lbs.—\$319.2 million—from 1.13 billion lbs., valued at \$324.8 million, in '58. Scouring cleaner sales reached 367 million lbs.—\$50.8 million—up 4.6% and 3.7%, respectively.

Bids on sodium carbonate will be opened March 4 by the U.S. Army Chemical Procurement District of New York. Needed: 273,000 lbs.

Plastics in building applications will be the subject of the '60 spring conferences of the Building Research Institute to be held at New York's Statler-Hilton Hotel April 5-7. Under scrutiny will be results of a year-long study of the building market for plastics by an advisory task group of the organization. About 30 experts who will discuss the subject include architects, manufacturers, educators, government researchers and contractors.

World fats and oils output in '60 will hit a record 34.2 million short tons, according to a forecast by the U.S. Dept. of Agriculture. This level—if reached—will be 1%, 445,000 tons, higher than in '59, but will be far short of sharper gains made in '59. Expected output of edible oils in '60 is 13 million tons (about the same as in '59); production of industrial oils should be up about 5%—55,000 tons—largely because of more linseed and castor oil. Animal fats and marine oil output will increase slightly.

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dibutyl phthalate

di-isobutyl phthalate

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dioctyl phthalate (DOP)

di-isooctyl phthalate (DIOP)

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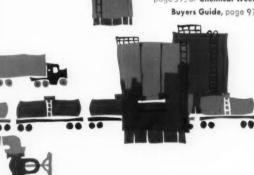
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# Market Newsletter

CHEMICAL WEEK March 5, 1960 The push to expand synthetic rubber markets (CW Market Newsletter, Feb. 13) received new impetus the past week.

Monsanto gave its customers more than a year's notification that bulk base price of rubber-grade styrene monomer will be shaved 0.8 e/lb. on July 1, '61. It means tabs will drop from 12e/lb to 11.2e/lb. 16 months hence (current escalation factors will continue in effect).

Price reduction, says Monsanto, reflects manufacturing economies expected from a 200-million-lbs./year capacity increase, first stage of which will be in operation in the first quarter of '61.

About a year ago Monsanto handed styrene customers a similar reduction  $(0.7 \rlap/e/lb)$ , to the current  $12 \rlap/e$ ) following completion of the firm's 40-million-lbs./year capacity plant at Texas City, Tex.

But at that time the price reduction wasn't solely attributable to process economies—low cost of benzene was a contributing factor.

Meanwhile Du Pont cut the price of synthetic rubber (Hypalon)  $10-23 \ensuremath{\wp}/lb$ , depending on type purchased. The reductions—effective March 1—put Hypalon into the price range of other elastomers. Object: to broaden applications.

Italy is selling synthetic rubber at "political prices." Italian import-export prices of synthetic rubber average \$661.25 and \$453.29/metric ton, respectively. The disparity "confirms" beliefs of Italian observers that Italy's state oil and gas monopoly is exporting rubber—mainly to Russia, Red China and Germany—under cost, and certainly under tabs charged on the Italian domestic market.

In any case, Italy's synthetic rubber exports have soared—from 14,791 metric tons in '58, to 247,890 in '59.

Largest single sulfur shipment ever made—20,900 long tons of 99.98% pure bulk sulfur—has been put aboard the Norwegian vessel H. L. Lorentzen berthed at Port Sulphur, La.

Sulphur Export Corp.—overseas sales agency for leading U.S. sulfur producers—says the load is heading for Rotterdam and Hamburg; source of the sulfur was Freeport Sulphur, which, incidentally, also filled the preceding record single shipment of 18,355 tons in '58.

U.K. Atomic Energy Authority has cut the price of uranium so as to expedite British construction of power plants abroad. Reports from London indicate that cost of fabricated natural uranium fuel elements has been dropped to \$47,000/metric ton of uranium content, from a previous \$56,000. However, AEA won't confirm the report now.

# Market

# Newsletter

(Continued)

The price reduction—spurred partly by a worldwide uranium surplus—won't benefit domestic power stations in Britain just yet, but similar cuts for the home market may come later.

Chlorine and soda ash prices are up \$2 and \$2.50/ton, respectively, bringing tabs to the following f.o.b. levels (effective April 1): \$65/ton, in single-unit tank cars; \$83/ton for 60 tons or more per year to one consuming point (shipped in 15 one-ton units/car.)

Columbia-Southern also put out these new bulk schedules on soda ash: light and medium, \$33.50/ton (\$39.50/ton in 100-lb. bags); dense, \$34.50/ton (\$40.50 in bags). Other producers are posting similar increases.

A calcium chloride price increase was simultaneously tacked up by Columbia-Southern. Regular flake (77-80%) goes up to \$26/ton; Hi-test flake (94-97%) to \$32.50/ton—both bulk prices. Powdered (77% min.) soda ash in 100-lb. bags, \$38/ton.

Removal of lead-zinc import quotas and imposition of higher tariffs by the White House is a "near-certain bet," according to Washington observers. The potential tariff boost is the nub of a bitter fight waged by the Tariff Commission, Congress and the Administration.

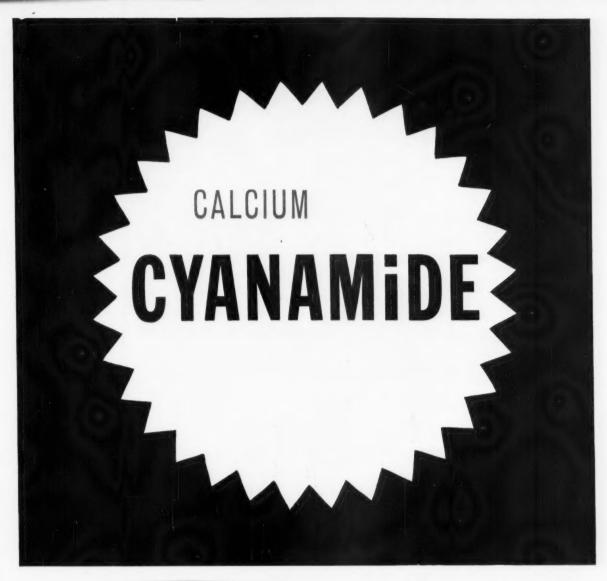
U.S. lead-zinc marketers have been generally unhappy about current quotas (CW Market Newsletter, Feb. 20) but are split on how much tariffs should be boosted. One guess of final compromise rates: from  $1\frac{1}{4}$  to  $2\frac{1}{2}\frac{e}{1}$ b. on ores and concentrates of both metals, higher rates on semifinished forms. Existing rates are  $\frac{3}{4}\frac{e}{1}$  on lead,  $\frac{3}{4}\frac{e}{1}$  on zinc.

Big changes in chlorine transport are in the wind. Next week Food Machinery and Chemical Corp. will begin the first commercial tank-wagon shipments of liquid chlorine in the U.S. FMC customer Dover Chemical Co. will use its own truck to transport the material to its Dover, O., plant from FMC's South Charleston, W. Va., location.

Chlorine is usually tank-trucked in other countries, e.g., Mexico, but has never been so handled in the U.S. Reason: concern by producers over risks of hauling chlorine through densely populated areas. Virtually all U.S. bulk chlorine moves by barge and rail car.

Dover cites the cut in transit time (from six days to one) and the increased flexibility as major reasons for the change from rail shipment.

The slight trend toward disposable pallets continues. Latest development: a lightweight paperboard disposable made by Union Bag-Camp Paper Corp. The 8-lb. throwaway pallets are lighter, cost 90¢ each in car-load lots.



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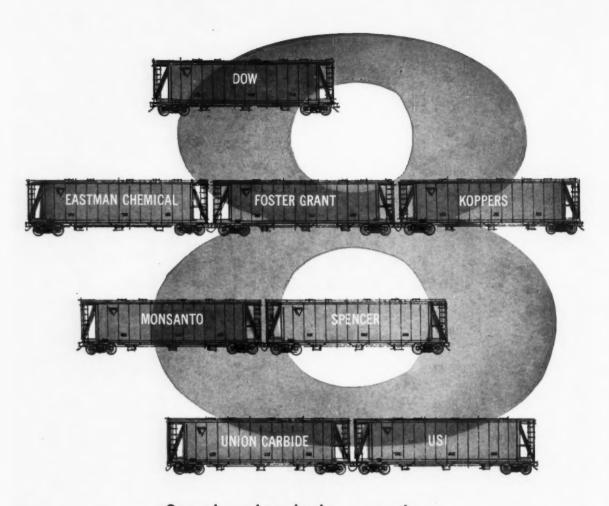
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Carbide's Sharp: 'Markets are harder to build than plants.'

# 'Markets Don't Just Happen'

Is the plastic industry developing markets fast enough to keep pace with burgeoning plant capacity? Faced with growing overcapacity in some lines, marketing management men are having second thoughts; and today, their concern is heightened by severe competitive pressures, such as price-shading and weakening credit terms.

The answer, according to some observers, is greater emphasis on opening new markets for plastics.

This week one of the most vocal proponents of the value of market development, Theodore "Ted" Sharp—director of product marketing at Union Carbide Plastics Co., division of Union Carbide Corp. — cautions

the plastics industry specifically on the overcapacity problem.

Says Sharp, "Of all the problems facing the plastics industry today, I believe the toughest, and most urgent, is that of developing sound, growing markets for its products. We're building plant capacities at an explosive rate, but let's face it — it's much harder to build sound markets."

With deep conviction stemming from his years as a line salesman, Sharp — who heads up sales planning, new-product market development and advertising efforts—focuses attention on what is probably the most vexing marketing problem in the CPI.

"It's not enough to count on getting your share of the market just by building X pounds of plant capacity," he warns. "Actually, you've got no share of the market until you get out and sell your product. And now, with so many large-capacity producers bidding for the business, we are faced with this choice: either step up market development activities to broaden the uses of plastics, or face tougher competition for sales, marked by declining sales margins."

Overcapacity Origin: Main reason for Sharp's concern over the current supply/demand situation in plastics is the swelling of basic productive capacity in the face of current overcapacity for many resins. In '59, lowdensity polyethylene sales totaled 1,000 million lbs.; yet by year's end, producers had capacity for at least another 200 million lbs. And capacities for high-density resin totaled about 330 million lbs., while sales barely topped 90 million lbs. Currently, more than 250 million lbs./year of aditional polyethylene plant capacity is on the way, some 170 million lbs. of it being Carbide's. (Sharp points out, however, that Carbide is matching this ambitious expansion plan with the biggest market development appropriation in its history.)

Even more worrisome to some plastics marketing men is the tremendous scale of current plant-building plans. Plants of 50 to 100 million lbs./year no longer are uncommon. Plants of this size sometimes are built long before the entire output is needed, to enable the producer to cash in later on rapid market expansions. Meanwhile, instead of operating the plants at low levels, resin suppliers are tempted to crank up to near-capacity. Result: excess material floods the market, depresses sales margins and sparks extreme competitive measures

In recent years, following high-density polyethylene's debut, plant capacity almost immediately shot to more than 300 million lbs./year—four times the initial plant capacity of any other plastic in history.

And now, with polypropylene capacity jumping ahead, optimistic sales forecasters are predicting a 1-billion lbs./year sales mark by '65 or '66 for the newest of the polyolefins.

Dwindling Exports: A further reason for stepping up market develop-



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SALES

ment activities is the imminent loss of important export markets.

Although U.S. plastics exports have never been huge, they multiplied by more than 20 times between '54 and '59, to nearly 300 million lbs./year. "This provided a major balancing factor for domestic polyolefin overcapacity in recent years," notes Sharp.

But now, major producers estimate this market will drop off to some 100 million lbs. annually by the mid '60s because of startup of overseas facilities.

Plastics — Modern Magic: A "benign sales atmosphere," says Sharp, is another reason why market development efforts have lagged behind production capacity. Most current sales managers were brought up during recent periods of prosperity—when the sellers ruled the market—have little first-hand experience in the tactics of the hard sell.

Added to this is the widespread conception that plastics may be some sort of magical materials. This tendency is illustrated by frequent use of stock phrases such as "magic molecules," "billion-pound plastic," "materials of the future." Constant bombardment with optimistic reports of intriguing new uses for plastics actually may soothe some marketing men into a sense of complacency about the size of the market development job to be done, some observers say.

Target End-Users: Sharp believes CPI management should think of market development — in its broadest sense — as "removing all the bottlenecks to more widespread acceptance by end-users." The real essence of market development, according to Sharp, lies in identifying likely markets, analyzing their potential, determining whether it is worthwhile to develop them more rapidly, then allocating resources to get on with the main job of selecting and selling key end-users on the material.

Viewed in this light, market development becomes another form of investment, with the return being measured in terms of increased sales and profits sooner than would otherwise be realized, says Sharp.

"Of course, it would be silly to think that you could build a sound market for a product that was not suited to the job, either technically or economically," he emphasizes. "In



'Developing markets is the toughest problem facing the plastics industry.'



'Market development actually is an investment in faster sales growth.'



'Producers should build markets before they add new plant capacity.'

# Meet Ray Funk



Ray Funk is one of the men who have helped build Standard Oil's reputation for delivering NH<sub>3</sub> and Nitrogen Solutions on time and when promised: Working through Standard's traffic department shipments are expedited and followed closely to assure delivery. Ray's knowledge of such things as when the tank car will leave the area and the number of lines handling are what assure you that the car you've ordered will be coming onto your siding when it is due.

Ray keeps a running record of tank cars available, and he knows accurately the schedule of truck shipments. He is thus able to help customers estimate the delivery time on NH<sub>3</sub> and Nitrogen Solutions shipped by truck.

You don't learn this job overnight. Certainly Ray didn't. He's been in the Standard Oil sales department for 22 years. Thirteen of these years have been in customer service work. Many's the time Ray has been on the telephone at home after midnight making sure someone's shipment went through on time.

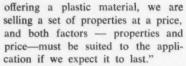
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Market Problems: But market development efforts pose problems that management cannot always solve easily. For one thing, how do you determine when an extensive market development campaign is warranted? And when it's under way, or nearly completed, how do you measure results? By what amount did you increase the market? Can you be sure it would not have grown nearly as much without the development effort?

Sharp answers: "These are difficult questions, and plastics marketers—like marketers in other areas—are simply not ready at the present time to answer them quantitatively. But we can get a good qualitative judgment by measuring actual performance against our projections and market estimates.

But even more troublesome than lack of precise information is the activity of what Sharp calls "the sharp-pencil boys" — the price cutters. Often, these producers have little or no capital invested in market development, can thus afford to shave prices to get business. This hurts those who do spend large sums to build markets.

The Challenge: What can resin producers and processors and other CPI management do to help overcome this broad industry problem? Sharp offers a challenging formula: "When adding new production capacity, management should allocate enough money and manpower to develop markets for the incremental output. Moreover, we should begin to think of this as a genuine responsibility, not just a nice gesture."

The benefits of a broad attack on overcapacity are substantial enough, claims Sharp, for everyone to benefit: the producer — by receiving sufficient return to plow into other new ventures, and the consumer — by getting a continued supply of useful new products.

Sharp's forthright analysis and comment on the present state of market development in the plastics industry will probably stir opposing views. But few in any CPI effort will take issue with his basic tenet: markets don't just happen; for maximum return, they must be cultivated.



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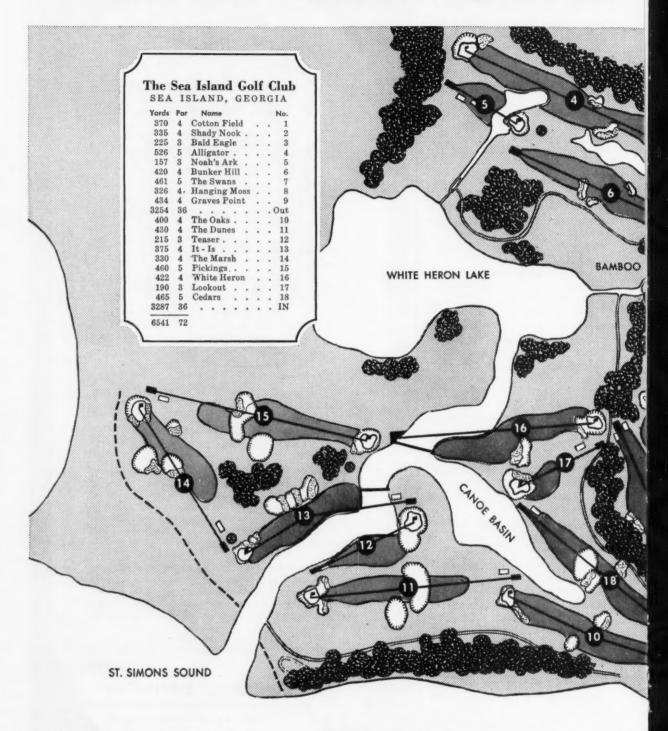


# DATA DIGEST

- High Temperature Materials: Brochure describes 26 new materials that offer improved resistance to high temperatures, chemicals, nuclear radiation, and abrasion. Among those listed are carbides of zirconium, hafnium, titanium and silicon; diborides of tungsten, titanium and zirconium; zirconium and hafnium metal, and other ceramics and refractories. Dept. B.M.D., The Carborundum Co. (Niagara Falls, N.Y.).
- Industrial Chemicals: New 12-page price list presents company's line of fine and industrial chemicals. Prices are listed on a per-pound basis along with information on containers. J. T. Chemical Co. (Phillipsburg, N.J.).
- Carbon Blacks: Booklet describes company's line of carbon black pigments for use in protective and decorative coatings. Characteristics of several groups of carbon blacks—including furnace blacks and channel blacks—are presented along with information on selecting and dispersing them for specific paint applications. Godfrey L. Cabot, Inc. (125 High St., Boston, Mass.).
- Chlorine Sources: New technical bulletin describes properties and suggested applications of chlorinated cyanuric acids and salts used in dry bleaches, sanitizing compounds and scouring powders. Inorganic Chemicals Division, Monsanto Chemical Co. (St. Louis).
- Fuel Additives: Folder furnishes data on two types of additives for fuel oils—the sludge-preventive type, and the inhibitor-dispersant type. Tretolite Co. (St. Louis).
- Stainless Steel Drums: Booklet describes sizes and specifications for process and shipping drums constructed of stainless steel. Inland Steel Container Co. (Chicago).
- Surfactants: Current brochure presents technical data on surfactants used in foaming agents, detergents, surface-modifiers, emulsifiers, corrosion inhibitors, wetting agents, viscosity controllers, and dispersants. Five charts show properties, uses and chemical formulas of amines, alkanolamides, normal acyl sarcosines, and fatty-acid esters of higher polyglycols. Geigy Chemical Corp. (Ardsley, N.Y.).



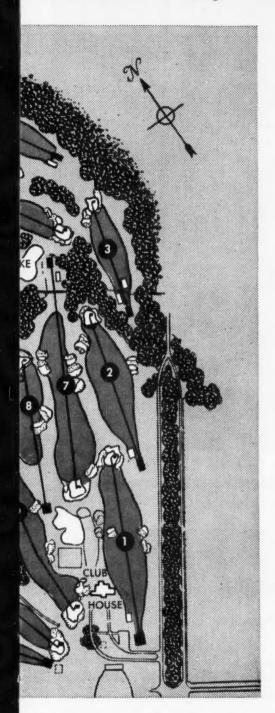
# What do the Sea Island Golf Club and

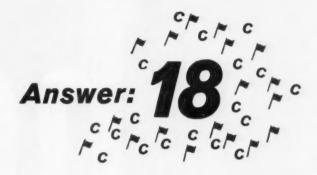


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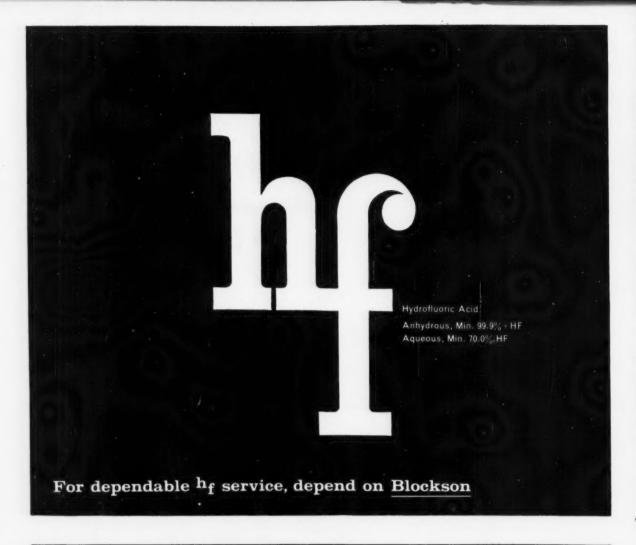
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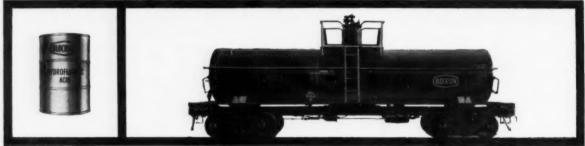
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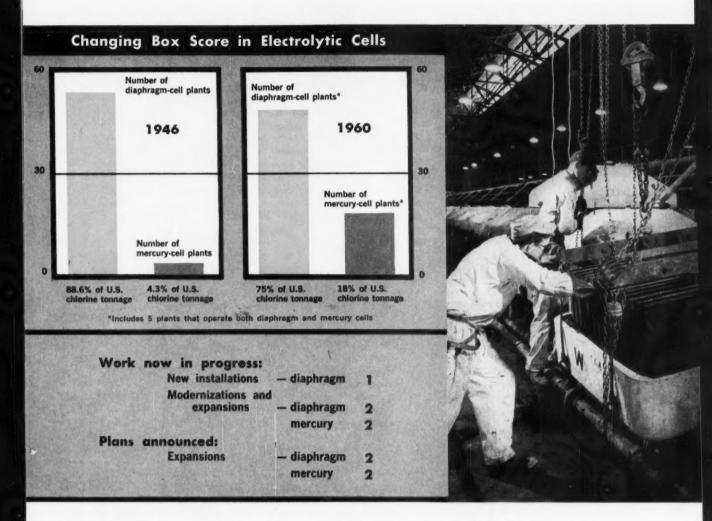


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# PRODUCTION



# Cell Users Get New Fuel for Old Debate

It comes as a surprise to some; but Hooker Chemical's decision to bypass its own Type-S diaphragm cells, install Hoechst-Uhde mercury cells—as part of a four-step expansion of chlorine, caustic soda and caustic potash production at Niagara Falls (CW Business Newsletter, Jan. 30)—is quite predictable in the light of the chlorine-caustic production picture (charts above).

Hooker, in its annual report for '59, called the move "an important milestone in our history." This raised some chemical industry eyebrows, because the Hooker name is virtually synonymous with diaphragm cells. Its Type S cells are in 45 installations, including 12 abroad. These cells pro-

duce 40% of U.S. chlorine and more of the world's supply than does any other cell.

The effect the installation of mercury cells will have on the company's prestige as the major licenser of diaphragm cells remains to be seen. Meanwhile, proponents of mercury cells may well claim that it's further evidence of the steady trend away from use of diaphragm cells. As the table (above) shows, only 4.3% of U.S. chlorine was produced by mercury cells in '46; about 18% is being turned out today.

Few chlorine producers seem surprised by Hooker's move. In their book, it is smart manufacturing procedure. Mercury cells, combined with diaphragm cells, add to production economy and flexibility. And, as Hooker has already pointed out, mercury cells can produce caustic soda and caustic potash of much lower chloride content.

Chloride Key: Comparisons of mercury and diaphragm cells have been made periodically for a number of years, with mercury cells winning most favor. But mercury cells' advantages are far from clear-cut, are often canceled by disadvantages; although, for production of low-chloride-content caustic soda, their superiority is unchallenged.

Mercury-cell caustic typically analyzes 0.002-0.001% sodium chloride, compared with about 1% from dia-

phragm cells—0.16% when purified. Most caustic users don't need lowchloride material, but the rayon trade must have it.

Meanwhile, chlorine producers are keeping close tabs on caustic potash for heavy-duty liquid detergents for washing machines. Lever Brothers is now the only major firm in the market; but if others move in, the caustic potash market could pay off handsomely. The potash would be used to make the phosphate in the detergent; and high-salt-content potash would cut detergency. Hooker's new mercury cells should permit the company to discard old Vorce diaphragm cells that have been used for making caustic potash.

To make caustic potash, mercurycell plants need only change their brine feed from sodium chloride to potassium chloride. Diaphragm-cell plants run into the same high-chloride problem they have with rayon-grade caustic soda, have an additional one in purification facilities. For example, production of 351/2 tons of chlorine from sodium chloride yields 40 tons of caustic soda; but from potassium chloride, the yield is 56 tons of caustic potash. The diaphragm-cell plant's evaporation facilities would have to be increased approximately 30% to handle the additional load.

Balancing Out: The European chemical industry has puzzled over this country's slow adoption of mercury cells. Figures show that the percentages of chlorine produced in Europe in mercury and diaphragm cells is the reverse of those in the U.S.—there, mercury-cell production predominates. But, in Europe, many factors other than caustic quality play important roles.

Generalizations based on cost are difficult to make. Diaphragm cells are smaller, require less floor space per ton of chlorine produced. Initial cell room costs are lower, and the brine feed doesn't require as much purification.

But, because mercury-cell installations require no caustic purification facilities, the basic costs balance out.

A geographical study helps generalize operating costs. Mercury cells require more power than diaphragm cells, and mercury-cell plants are more often located in low-cost power areas. For example, three installations in Alabama's TVA area (installed in

the early '50s) use mercury cells, while in the Texas Gulf area, where natural gas is an inexpensive heating source for evaporation, only one installation in six is using mercury cells.

Production savings and flexibility gained by Hooker's combined installation at Niagara will be watched closely by many diaphragm-cell operators.

Recovered salt from the diaphragm-cell process can be used for brine makeup for mercury cells, eliminating the extra cost for brine feed purification. Five larger plants are now operating both diaphragm and mercury cells.\* But this usually isn't practical in small plants, where it would be difficult to balance production, obtain sufficient recovered salt to keep the mercury cells in continuous operation.

Big Question: Although most chlorine producers are convinced of the wisdom of Hooker's move, they are still studying the choice of Hoechst-Uhde cells. Hooker lists two principal reasons: the 120,000-amp. cell, which has been available for only about three years, has a high current density, making possible greater output per dollar of investment and economy of floor space; also, the graphite anodes are more easily adjusted than on other mercury cells.

The cells will be mounted on two floors—i.e., one bank of cells on top of the other—saving copper busbar leads from the power rectifiers.

Hoechst-Uhde has always claimed a lower cell voltage for any given current density than any mercury cell except Solvay's and Olin Mathieson's. But Uhde's voltage is guaranteed.

Others point out the Solvay cell's greater floor-space economy: it has servicing catwalks built directly over the cells rather than beside them. A few chlorine producers shy away from this type of construction because of the heat generated by the cell.

Most cell users say that there is really little to choose between any of the mercury cells available. For example, anode adjustment was a problem with most earlier cells, but all users have solved that problem. Also holding back mercury cells: they're not available from U.S. firms. Olin Mathieson and Dow have developed their own mercury cells within the past few years. Little is known about the Dow cell; and Mathieson, after installing some at General Aniline & Film Corp.'s Linden, N.J., plant, reportedly withdrew from the market.

De Nora has made the greatest inroads in the U.S., maintains an office in New York. Both Hoechst-Uhde and Belgium Solvay (North American Solvay in this country) maintain New York offices. But Solvay cells have been installed only in Allied Chemical's Solvay Process Division plants.

BASF-Krebs has no offices for cell licensing in this country; installations have been restricted to Mexico and Canada.

One thing is certain: with Hooker on its list of purchasers, Hoechst-Uhde has an excellent talking point for future sales. The only other Uhde cells in this country are in Columbia-Southern's New Martinsville, W. Va., plant.

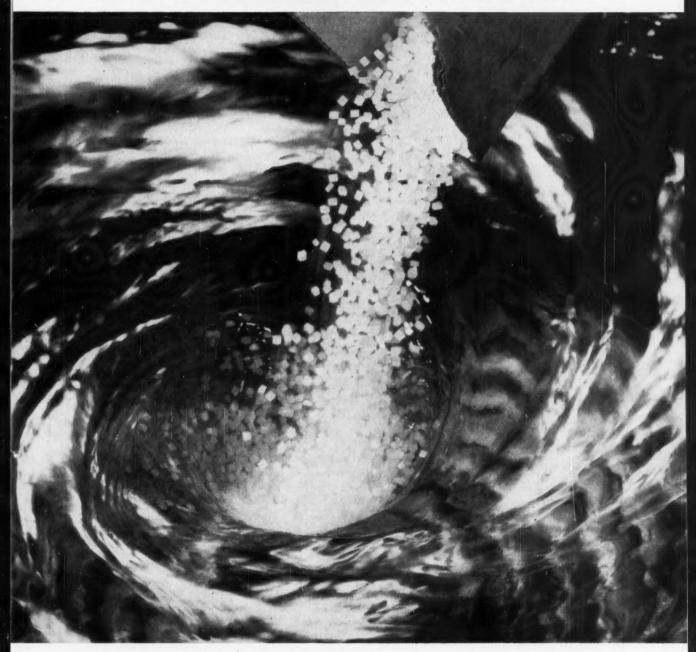
Many U.S. chlorine producers are reluctant to make the necessary extended European tours to study various mercury-cell installations. But this situation may be rectified in the future. Hooker reportedly is working on a mercury cell of its own design, might have it ready for a later phase of the Niagara Falls expansion. (Hooker has said that it will add its own diaphragm cells after it puts in the Hoechst-Uhde cells, then complete the expansion with mercury cells—but hasn't revealed the design of these mercury cells.)

No Knockout: Regardless of mercury cells' inroads in this country, diaphragm cells can't be counted out. True, diaphragm cells now have a limit of about 30,000 amps. in size, which requires more numerous parts and connections than for mercury cells. Thus, mercury cells seem destined for use in many of the larger installations.

Nevertheless, recent new installations and expansions indicate that the diaphragm cell is more than holding its own. Until advantages and disadvantages clearly favor mercury cells in all locations, diaphragm cells will retain the bulk of electrolytic-cell chlorine and caustic production.

<sup>\*</sup> Allied Chemical's Solvay Process Division (Syracuse, N.Y.), Columbia-Southern Chemical Corp. (New Martinsville, W. Va.), Diamond Alkali Co. (Houston, Tex.), Dow Chemical Co. (Pittsburg, Calif.), Wyandotte Chemicals Corp. (Wyandotte, Mich.).

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	Agency—Barber & Drullard, Inc. 91	EMPLOYMENT 99
ATLANTIC REFINING CO	*METAL HYDRIDES, INC	FOR Sale
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CLUPAK, INC	PENNSYLVANIA INDUSTRIAL CHEMICAL CORP	3-6951
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Agency—Fuller & Smith & Ross, Inc. 40	Agency—Gordon J. Wiesbeck, Inc.  SHELL CHEMICAL CORP	Dallos 1 Gene Holland, Gordon Jones, The Vaughn Bldg., 1712 Commerce St.,
*DUPONT DE NEMOURS & CO., INC., E. I. FREON PRODUCTS DIV		Riverside 7-5117  Denver 2 J. Patten, 1700 Broadway, ALpine 5-2981
Osborn, Inc.	*SINCLAIR PETROCHEMICALS, INC. 30 Agency—Geyer, Morey, Madden & Ballard, Inc.	Detroit 26
DURIRON CO., THE 4th Cover Agency—Kircher, Helton & Collett, Inc.	SONNEBORN CHEMICAL & REFINING CORP	Frankfurt/Main Michael R. Zeynel, 85 Westendstrasse, Germany
*EASTMAN CHEMICAL PRODUCTS INC. 81 Agency—Fred Wittner Co.	SPECIALTY MACHINERY CORP 44 Agency—Lewis Studios	London E.C. 4 . E. E. Schirmer, McGraw- Hill House, 95 Farringdon St., England
EMERY INDUSTRIES, INC 57 Agency—Farson, Huff & Northlich, Inc.	STANDARD OIL CO. (INDIANA) 89 Agency—D'Arry Advertising Co.	Los Angeles 17 Robert Yocom, 1125 West Sixth St., HUntley 2-5450 New York 36
*ENJAY CO., INC	STANDARD STEEL CORP 79 Agency—The McCarty Co.	West Sixth St., HUntley 2-5450  New York 36 Knox Armstrong, B. A. Johnson, P. E. McPherson, Charles F. Onasch, L. Charles Todaro, 500 5th Ave., OXford 5-5959  Philadelphia 3 William R. Hannum, Jr.
ETHYL CORP	SWIFT & CO	6 Penn Center Plaza, LOcust 8-4330
FLUOR CORP	TEXAS GULF SULPHUR CO	Pittsburgh 22 Duncan C. Stephens, Room 1111 Henry W. Oliver Bldg., EXpress 1-1314
FRONTIER CHEMICAL CO	*TRUBEK LABORATORIES, THE 2nd Cover Agency-Bay Ellis Advertising	San Francisco 4 William C. Woolston, 68 Post St., Douglas 2-4600
FRUEHAUF TRAILER CO	U. S. TESTING CO	St. Louis 8 R. J. Claussen, 3615 Olive St., Continental Bldg. JEfferson 5-4867

\*For complete product data see catalog unit in the BUYERS' GUIDE ISSUE for 1959-60

# EQUIPMENT

Plastic Sealer: Plastic Welding Corp. (841 Frelinghuysen Ave., Newark 12, N.J.) is offering a new line of thermal impulse sealing units that utilize a rapid heating and cooling action to achieve optimum seals on such films as polyethylene, saran and vinyl. A thin ribbon of high-temperature alloy having a low thermal capacity quickly heats and cools when pulsed with a high current for a short time interval. Sealing length: up to and including 8½ in.

Pipe Connecter: Victaulic Company of America (835 Lehigh Ave., Union, N.J.) has a simple, low-cost and leaktight method of connecting plain end pipe by means of couplings fitted with hardened stainless-steel grips that engage the pipe ends and securely lock them together. The couplings, installed with an ordinary wrench, are available with plain ends or in combination of plain and grooved, threaded or flanged ends. Sizes: 1, 2, 21/2, 3, 4 and 6 in. The company claims this is the first time this type of coupling has been offered to industry in sizes over 2 in.

Plastic Hose: A transparent polyvinyl chloride hose reinforced with open-mesh nylon is being made by Newage Industries, Inc. (222 York Rd., Jenkintown, Pa.), to withstand pressures up to 1,500 psi., while retaining the qualities of standard plastic hose. The hose is resistant to gasoline, sea water, oils, high-octane fuels, coal and butane gases and most chemical solutions. The working temperature ranges from 170 F to —5 F. Bursting pressure of ½-in. ID is 1,500 psi., ¼-in., 1,200 psi., ½-in., 800 psi.

Steam-Turbine Control: General Electric (Schenectady 5, N.Y.) has a new electrohydraulic control system for its medium-capacity steam turbine-generators claimed to be 10 times faster and four times more sensitive than present mechanical controls. The new control system consists of a tachometer, generator, pressure transducer and a solid-state analog computer, which directs hydraulic valve positioning devices. The computer has high reliability with solid-state, electrical components designed for long life and flexibility.

# Tracers

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### POSITION VACANT

Chemist: A successful plastic extrusion manufacturer in Eastern Massachusetts has epening for a degree chemist to assume responsibility of laboratory on formulation testing, quality control and new product development. Applicant must have industrial experience in compounding of vinyls for extrusions. All replies will be held in strict confidence, P-3546, Chemical Week.

Chemist: Permanent position with growing company. Familiar with industrial finishes formulating. Experience with trade sales and water base paints helpful but not necessary. Replies held in strict confidence. Wisconsin Paint Mig. Co., 3710 N. Richards Street, Milwaukee 12, Wisconsin.

Market Analyst. Pharmaceutical Research Laboratory interested in young man with background in market analysis. Experience in the pharmaceutical or chemical held highly desirable. Send resume to P-3764, Chemical Week.

Plant Manager: Due to a promotion, we have an excellent opportunity for the right man to manage one of our chemical fertilizer plants. The man selected for the position will assume responsibility of producing a quality product at peak production efficiency. He will coordinate production schedules with sales estimates, requisition raw materials and maintain good employee and customer relations. Fertilizer manufacturing experience preferred, but will consider man with experience in similar mixing operations. College degree preferred in Business Administration, but will accept high school education if experience is sufficient. Courses in chemistry definitely helpful. Midwest location. Reply in confidence stating age, education and salary requirements, P-3823, Chemical Week.

Polymer chemist with experience in calandering, extrusion, and formulation of vinyl type sheets. Small company, new product, with national distribution. P-3819, Chemical Week.

### SELLING OPPORTUNITY AVAILABLE

Technical Sales Representative: Expanding sales program of Vitro Chemical Company offers a challenge and opportunity in the mid-west for outstanding personal accomplishment to the right man. Products include metal salts for the metal inishing and chemicals and thorium compounds for a variety of new and intriguing applications. If you are interested in becoming a member of a new group, with a bright future in the progressive Vitro family, please send a resume of your experience, education and salary requirements to General Sales Manager, Vitro Chemical Company, 630 Third Avenue, New York 17, N.Y.

Industrial Salesman. Excellent opportunity for technical salesman preferably with 1 to 3 years of protective coatings sales experience to train and sell in the midwest. Send resumes for confidential consideration to: Employment Manager, Archer-Daniels-Midland Company, P.O. Box 532, Minneapolis 40, Minnesota.

Representation for Boxed Corboys—gloss & plastic bottles; 5-6½-13-gallon capacity; to cover chemical m'fers. Areas open east of Mississippi. May carry other lines. United Box & Lumber Co., 45 Wheeler Point Rd., Newark, N.J.

Selling Agents Wanted—Can you locate markets for additives or other organic chemicals in the volume range of fifty thousand pounds or more per year and selling at a dollar or more per pound? If so, and you are interested in working on a commission basis, please contact us. We have equipment and manpower for making such chemicals in high quality and at attractive prices. References exchanged. RW-3814, Chemical Week.

### POSITION WANTED

Fertilizer Production—Chem. Eng. under 35. Granulated Mixed Fertilizers, Triple, Super, and Sulfuric Acid experience. Desires position with opportunity. Resume & references. PW-3813, Chemical Week.

### SELLING OPPORTUNITY WANTED

New Chemical Sales Agency—We are an established AA-1 manufacturer of a resin used in the paint, ink, wax, rubber, paper, candy, and pharmaceutical industries. We are located in the Metropolitan-New York area and have excellent technical personnel and are used to giving service to our customers. We have our own sales organization and have appointed manufacturer's representatives in all the principal cities. Our sales volume is over two million annually. We are interested in negotiating with domestic or foreign companies for distribution of their products, either regionally or nationally, if sales potential is highly profitable. Reply in confidence. RA-3673, Chemical Week.

Established Manufacturers Representative selling process equipment to refineries, chemical plants Texas-Louisiana seeking additional line. RA-3820, Chemical Week.

### BUSINESS OPPORTUNITY

Does your product have national potential? But lacks a successful marketing program and needs capital? Write giving full particulars. BO-3341, Chemical Week.

Licenses for sale. New Electro-magnetic Laboratory, Pilot, Plant, Glass Stirrers U.S.P. BO-3833, Chemical Week.

### FOR SALE

Tolhurst 48" suspended basket centrifugal, T304 SS, pref. basket, 15—7% HP motor. Used only 50 hrs. Perry, 1415 N. 6th St., Phila. 22, Pa.

Bucket Elevator Jeffrey Stainless, 8x5 Buckets, 25' center. Nortz, 67 Van Reipen Ave., Jersey City, N. J.

Worthington 160 ton steam-jet vacuum refrigeration units, with barometric condenser. Perry Equipment Corp., 1415 N. 6th St., Phila. 22, Pa.

Resin Kettles. 2—3,000 gallon (18,000 lbs. Solid Charge), 7' diameter by 10'. Stainless with turbine agitator, cooling coils. Reflux tank and condensors each with new never used Selas gas units or one Trent electric jacket. Excellent condition equipment being replaced with larger units by synthetic resin mfgr. FS-3758, Chemical Week.

Tank Trailers for Chemicals Stainless Steelnew and used. Hackett Trade Co., Inc. P. O. Box 803, Packers St., Kansas City, Kan. MA 1-2363.

Buy To Advantage Acetic Anhydride, Glacial Acetic Acid, Acetaldhyde. "Produced locally for better service to you." Mercury Chemical Corp., Edison, N.J. Liberty 8-1540.

DBS Plast. Virgin Bulk 35¢. Barium Hydrox. N.F. (J. T. Baker Orig.) 15 Leverpaks \$0.06/lb. Toluol 10,000 gals. \$.20/gal. Isoprene-Enjay virgin 3 drums \$.15. Ohio Apex KP23 Plasticizer. Orig. drums \$.12/lb. Virgin Neopentyl Glycologud drums. Trimethylol Propane 20-100# drums. Barrett Pyridine 15A 3 orig. drums \$.35/lb. Acetone 10,000 gals. \$.45/gal. DDA Plast., Virgin, 20 drs 37¢/lb. FS-3842, Chemical Week.

### LIQUIDATION

Send for Revised Illustrated Circular en our \$3,000,000 chemical plant liquidation at Orange, Texas. All T316 SS equipment including tanks, columns, heat exchangers, filters, centrifugals, pumps, valves, pipe, etc. Perry Equipment Corp., 1415 N. Sixth Street, Philadelphia 22, Pa.

### KNOW-HOW WANTED

Responsible concern desires know-how for manufacturing water-soluble methylated melamine formaldehyde resins. Concerns or individuals expert in this field please contact KHW-3816, Chemical Week.

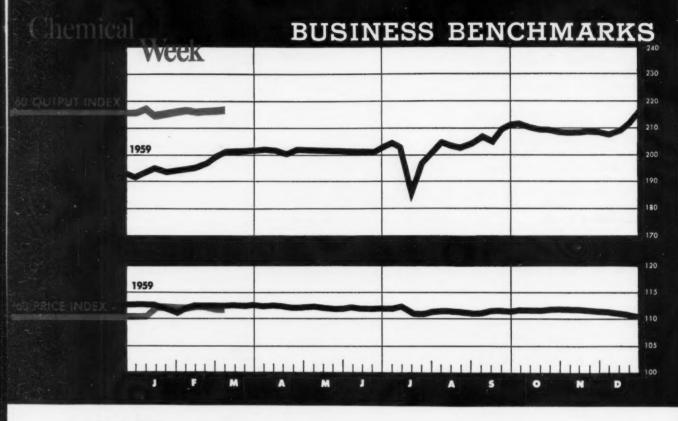
### CHEMICALS WANTED

Surplus Wanted — Chemicals, Pharmaceuticals Oils, Acids Plasticizers, Resins, Dyes, Solvents, Figments, Etc. Chemical Service Corporation, 96-02 Beaver Street, New York 5, N. Y. HAnover 2-6970.

### WANTED

Machinery Wanted: 66" high side Raymond mill in good condition. Write Wyo-Ben Products, P.O. Box 1919, Billings, Montana.

Spectrophotometer, used, complete spectrum, recording type. A. Gersen, P.O. Box 658, Passaic, N. J.



# MARCH 5, 1960

Latest Week	Preceding Week	Year Ago
217.7	217.5	200.5
111.5	111.2	111.9
53.97	53.20	51.31
2,671	2,674	2,506
14,226	14,071	13,259
7,312	7,256	7,208
Latest Month	Preceding Month	Year Ago
128.8	128.6	127.5
109.9	110.0	110.2
124.1	124.0	124.0
118.8	119.2	119.1
93.8	93.7	93.0
49.2	50.8	59.9
108.3	107.0	107.6
	217.7 111.5 53.97 2,671 14,226 7,312 Latest Month 128.8 109.9 124.1 118.8 93.8 49.2	217.7     217.5       111.5     111.2       53.97     53.20       2,671     2,674       14,226     14,071       7,312     7,256       Latest Month     Preceding Month       128.8     128.6       109.9     110.0       124.1     124.0       118.8     119.2       93.8     93.7       49.2     50.8

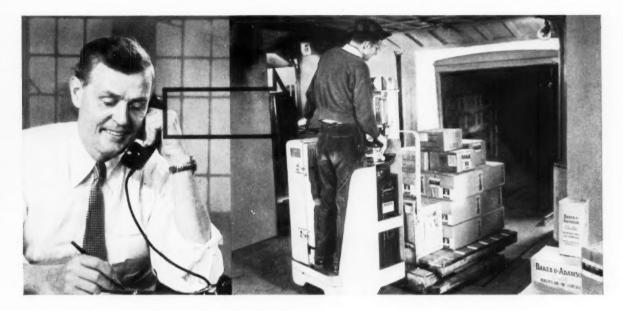
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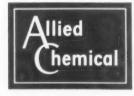
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